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WORK PLAN

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

ASBESTOS DUMP SITE
MORRIS COUNTY, NEW JERSEY

EPA WORK ASSIGNMENT
NUMBER 45-2LA2.0
CONTRACT NUMBER 68-01-6699

NUS PROJECT NO. 0772.01

DECEMBER 1983

ASB 001 1295

NUS CORPORATION

Park West Two
Cliff Mine Road
Pittsburgh, PA 15275
412-788-1080

D-31-11-3-15
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1.0 WORK PLAN SUMMARY

This Enforcement Remedial Investigation/Feasibility Study (RI/FS) Work Plan is based upon existing data which was compiled during Work Plan preparation and has been summarized in Section 2. No previous compilation and overall summary of data exists.

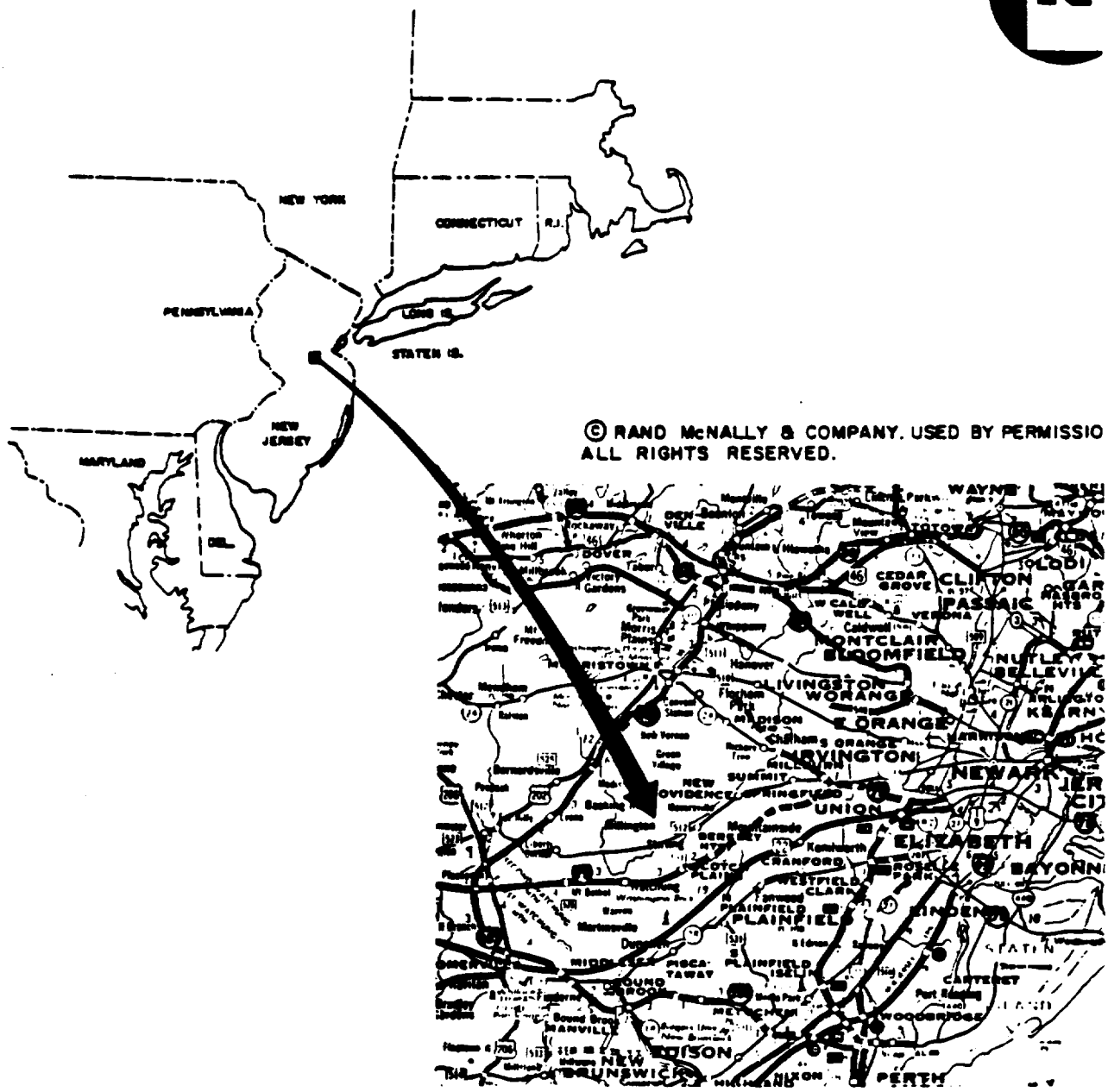
Preparation of this Work Plan has been guided by the National Oil and Hazardous Substances Contingency Plan (NCP).

1.1 Objectives

The Asbestos Dump Site actually consists of a primary site associated with asbestos shingle production and waste disposal, and three secondary sites of asbestos shingle disposal which may or may not be related to the production site. The primary site is located in Millington, New Jersey, while the secondary sites are located near Meyersville, New Jersey, three to four miles to the northeast. Collectively, the four sites are located approximately 18 miles southwest of Newark, and 13 miles northwest of Edison, New Jersey. Figure 1-1, Site Vicinity Map provides general location information.

The general objectives of the Remedial Investigation and Feasibility Study (RI/FS) are outlined below:

- Establish the nature and extent of disposal activities at each site.
- Define the extent of environmental contamination as a result of activities at each site and evaluate the existing or potential risk to public health and/or the environment.
- Establish and evaluate criteria by which to identify remedial alternatives.



SEE FIGURE 2-1 FOR GREATER DETAIL

FIGURE 1-1

VICINITY MAP
ASBESTOS DUMP SITE, MILLINGTON, N.
NO SCALE

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- Identify candidate remedial alternatives which would effectively address the current problem. Potential candidate measures include stabilization of the asbestos hill at the Millington Site, and elimination of potential public health threats at the remaining sites due to airborne asbestos fiber. In the event of chemical contamination of groundwater and/or surface waters, collection and treatment methodologies will be proposed for evaluation.

- Identify and evaluate the alternatives and select the most appropriate, cost-effective remedial action alternative(s) for conceptual design.

- Prepare a conceptual design of the selected alternative(s).

1.2 Scope of Work

The Asbestos Dump RI/FS will be subcontracted in whole or in part by NUS Corporation as the EPA Zone 1 Superfund Contractor.

Section 3 provides a detailed RI/FS Scope of Work (SOW) which consists of three phases and 25 individual tasks. This SOW will be implemented by a Pool Subcontractor selected by NUS Corporation. Overall project management and coordination will be the responsibility of NUS Corporation. The overall organization of the RI/FS is tabulated below:

- Phase I - Initial Activities
  Tasks Nos. 1 - 12

- Phase II - Site Activities
  Task Nos. 13 - 19

- Phase III - Feasibility Study
  Task Nos. 20 - 25

The Initial Activities provide additional background data for development of specific Site Activities. The Site Activities are the field data acquisition elements, and thus the major emphasis, of the Remedial Investigation.

Following summarization of the data obtained during the Remedial Investigation, the Feasibility Study (Phase III) provides identification and evaluation of remedial technologies. The ultimate aim of Phase III is to define the most suitable method of resolving the current problem.

The NUS Project Management Work Plan is outlined in Section 4. The latter is comprised of eight tasks necessary to provide overall project coordination.

1.3 Manpower Estimate and Costs

The total estimated cost of the RI/FS for the Asbestos Dump Site, exclusive of Contract Laboratory Program (CLP) analysis, is $515,060. This estimate includes both NUS and Pool Subcontractor effort. CLP costs for the Remedial Investigation are anticipated to be $86,540. The NUS manpower commitment under the Project Management Work Plan for project management and coordination of the RI/FS activities noted in Section 3 is 1,952 hours. The projected Pool Subcontractor manpower commitment is 5,894 hours.

The cost of laboratory and field studies will be estimated during preparation of the Laboratory and Field Studies Work Plan, and has not been included in the above estimates.

1.4 Schedule

A detailed schedule is provided in Section 5. The duration of the RI/FS to be performed by the subcontractor is anticipated to be 11 months. This schedule is an optimistic projection, however, and rests upon a number of assumptions, among which are expedient procurement of necessary permits and authorizations, favorable response times from subcontractors, a two to three week turnaround for

performance of analytical work, and adequate weather conditions for the conduct of the site activities without excessive delays. The schedule also assumes no adverse impact as a result of validation of sample results by EPA laboratories.

An additional twelve weeks prior to the initiation of the RI/FS will be required for NUS preparation of the Work Plan, subcontractor procurement, and overall project startup. The remainder of the NUS Project Management Work Plan will be conducted in parallel with that of the Pool Subcontractor.

It is emphasized that the cost and manpower estimates presented above do not contain any provision for the conduct of laboratory or field studies. If such studies are found to be necessary, a separate work plan will be prepared along with an estimated cost to perform the studies.

Similarly, the impact upon that portion of the schedule which is dependent upon the laboratory and field studies cannot be defined until the Laboratory and Field Studies Work Plan has been prepared under Task 22.

In addition it should be noted that modifications to the overall cost and/or schedule may be required to support EPA enforcement actions at this site. Technical direction in this regard will be taken from EPA enforcement personnel.

2.0 PROBLEM ASSESSMENT

2.1 The Site

This section provides background information regarding past activities which may have given rise to the present situation, and documents attempts to remediate the problem.

The central focus of the work plan is the Millington Asbestos Dump Site (Millington Site). However, three areas of asbestos shingle concentration located three to four miles northeast of the Millington Site may be linked to the latter, and will be addressed as secondary disposal areas.

These secondary disposal areas include the Great Swamp Site, and the Pine Valley Tree Service and White Bridge Road Sites.

Figure 2-1 serves as a location map showing the geographic relationship of all four sites.

2.1.1 Site History and Description

Millington Site

The Millington Site consists of an area of approximately 11 acres, comprising the TIFA, Ltd. (TIFA) office complex in Millington, New Jersey. In particular, the "asbestos hill", which is of primary concern in this Work Plan, extends for a distance of about 450 feet along the Passaic River at the extreme western end of the property. The maximum height of the pile from the outslope toe to the crest of the pile ranges from 20 to 30 feet. Outslopes approach 60 degrees from the horizontal (Schwartz, May 22, 1981). Figure 2-2 provides a plan view of the Millington Site, showing the asbestos hill and its relationship to the TIFA buildings. The easterly extent of the pile has been obscured by backfilling operations on the

BASE MAP IS A PORTION OF THE USGS BERNARDSVILLE AND CHATHAM (7.5 MINUTE SERIES, PHOTOREVISED 1970) QUADRANGLES CONTOUR INTERVAL 20'.

LEGEND N LATITUDE / W LONGITUDE

FIGURE 2-1

LOCATION MAP
ASBESTOS DUMP SITE, MILLINGTON, NJ
SCALE 1" = 2000'

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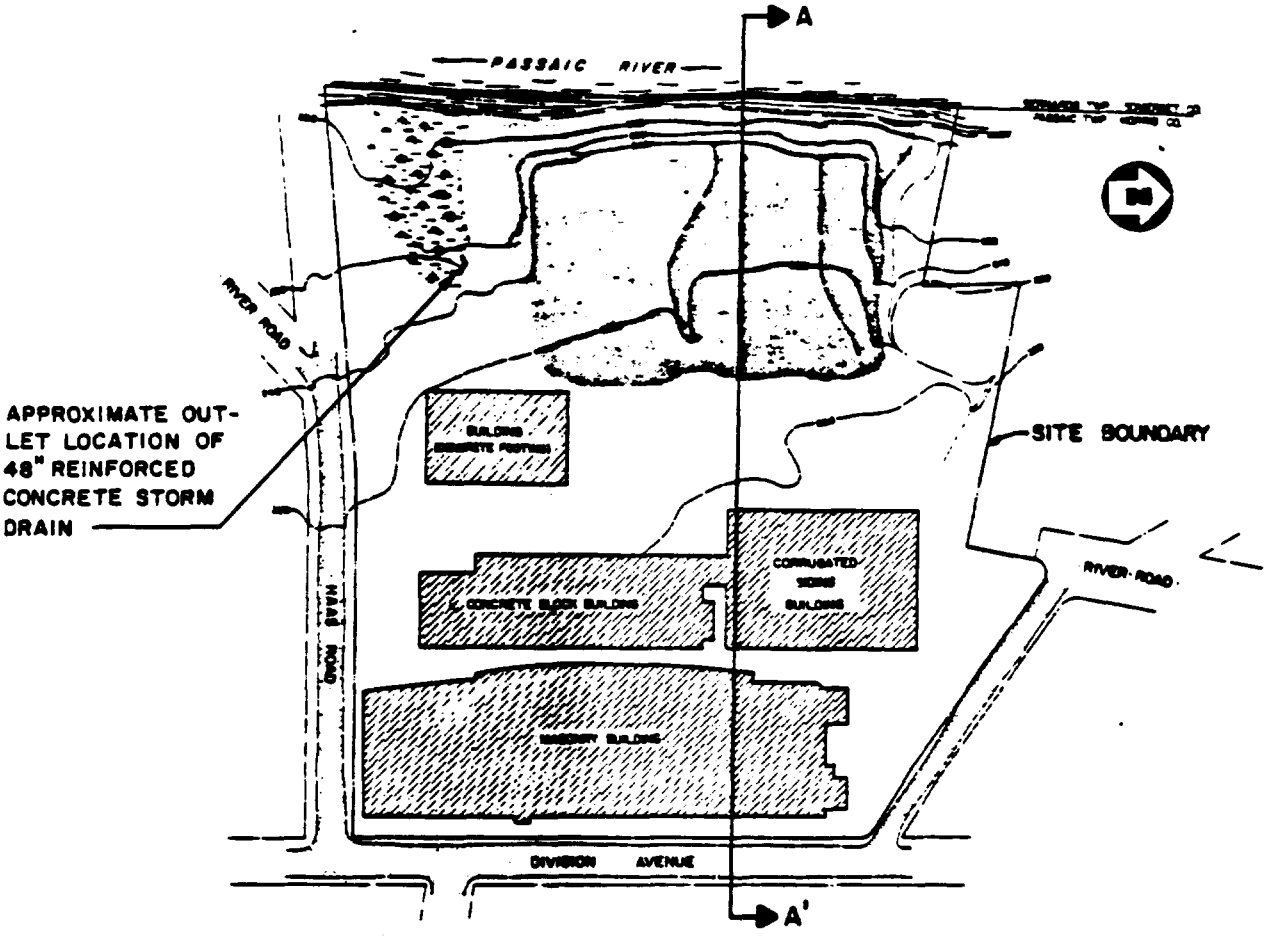

SOURCE: TAKEN FROM DRAWING Nº 6857; AUGUST 17, 1977; YANNACONE ASSOCIATES, INC. BERNARDSVILLE, NJ

BUILDINGS: TIFA, LTD. OFFICE COMPLEX

SECTION A-A', SEE FIGURE 2-3

ASB 001 1308

LEGEND

- APPROXIMATE LIMIT OF ASBESTOS HILL
- SWAMPLAND

FIGURE 2-2

SITE PLAN, MILLINGTON SITE
ASBESTOS DUMP, MILLINGTON, NJ

SCALE 1" = 200'

part of TIFA, and has been projected for the purpose of this figure. Total surface area of the asbestos hill may be as much as 3 to 4 acres.

Figure 2-3 presents a typical cross section showing the pile's geometry and relationship to the Passaic River and to the TIFA buildings. This section is based upon 1977 contours, and thus does not reflect backfilling done in 1980 by TIFA, as noted below.

The Millington Site was originally operated for asbestos shingle manufacture by Asbestos, Ltd., which began operations in 1927. The Site was purchased by Smith Asbestos in 1948. Smith Asbestos apparently continued manufacturing and waste disposal operations with little or no modifications (Bishop, April 3, 1978).

The asbestos hill was constructed by random dumping of asbestos-laden sediments. Process water slurry from asbestos manufacturing operations was apparently impounded to some extent on the surface of the pile. Makeshift dams were constructed to permit some settling of suspended asbestos fibers. These dams frequently overflowed, permitting direct discharge of process water to the Passaic River (Bishop, April 3, 1978).

Reference is also made in the literature to the fact that waste may have been trucked from the site to an unknown landfill (Mikulka, June 2, 1981).

The site was purchased by the Gold Bond Division of the National Gypsum Company (NGC) in 1952 or 1953 (Bishop, April 3, 1978). According to NGC the former waste disposal practices were discontinued shortly after they took over operations (Reilly, September 27, 1977). However, other sources alleged that NGC continued former waste disposal practices, and may also have been responsible for disposal of asbestos shingles at the three remaining sites.

The asbestos cement shingle manufacturing process involved the use of Portland cement, silica sand, and asbestos as raw materials. After being mixed into a slurry, these materials were collected on a wire screen of a "wet machine". This

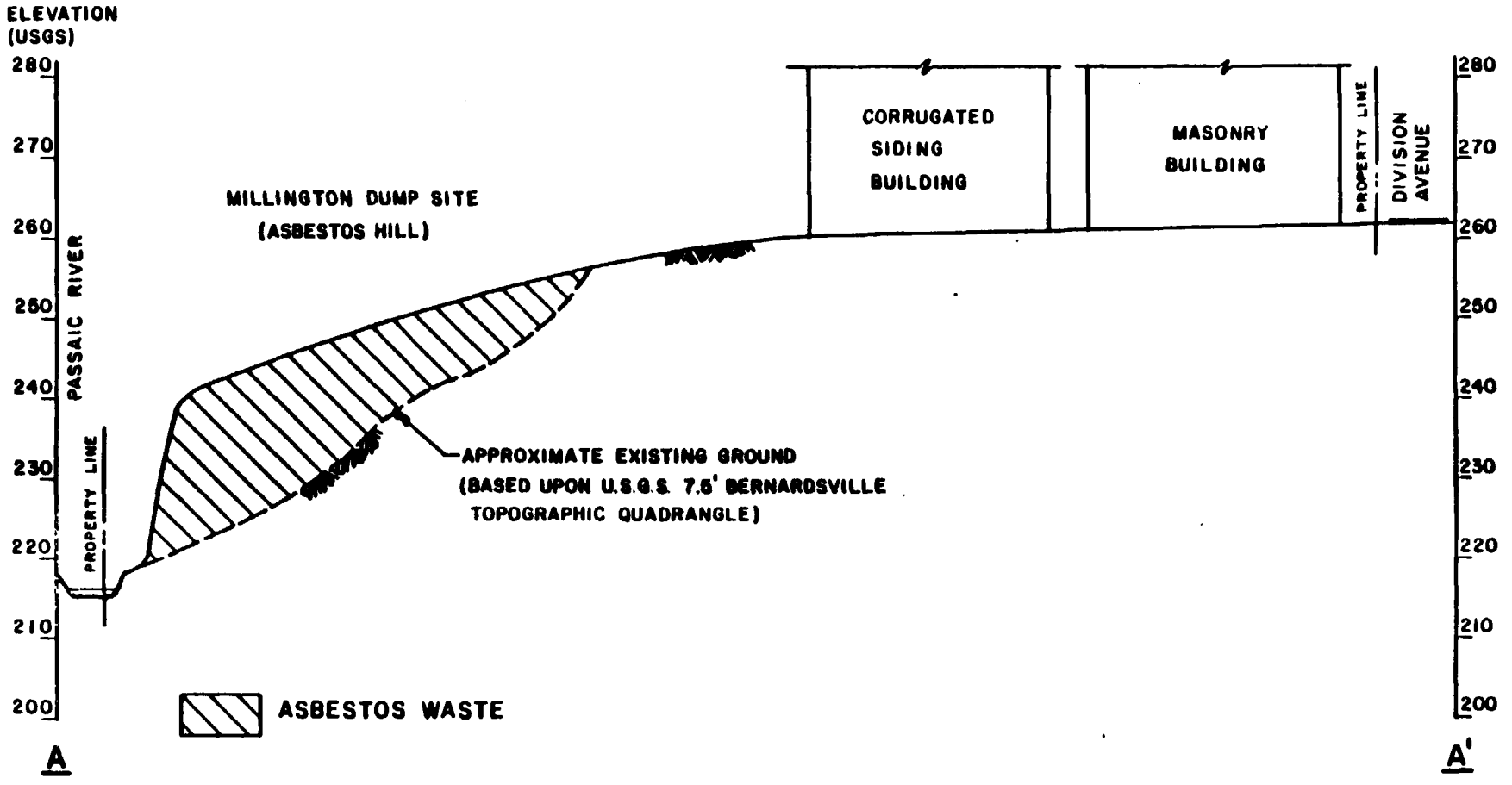

FIGURE 2-3

SECTION A-A', MILLINGTON SITE
ASBESTOS DUMP SITE, MILLINGTON, NJ

SCALE 1" = 100' HORIZ., 20' VERT.

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portion of the process was similar to paper manufacture. Process water was withdrawn through the screen. The solids remaining on the screen were transferred to a felt belt for further water content reduction through vacuum pumping and absorption on the felt. The asbestos mat produced was then cut to size, dried over an open flame, aged, and autoclaved to achieve final cure (Beggs and Pyarilal, 1975).

During active manufacture, approximately 3,600 pounds of raw asbestos was used daily (Ferrazzuolo, October 24, 1972).

All process water was collected in vertical tanks. The supernatant from these tanks was drawn off to two lagoons outside of the building for further settling prior to discharge to the Passaic River (Beggs and Pyarilal, January 7, 1975). Initially, discharge from the Millington plant was 70,000 gallons per day (gpd). In 1973 installation of water conservation and pollution control equipment reduced average outflow to 55,000 gpd (Schmidt, July 19, 1973; USEPA, March 8, 1974).

In addition to the asbestos manufacturing process line, effluent was also produced as waste paint from the paint wash line, which was routed to a third settling lagoon. As the latter was unlined, most of the paint apparently infiltrated the surrounding soil (Beggs and Pyarilal, January 7, 1975).

Prior to 1973 rigid polyurethane foam block was also manufactured at the Millington plant. Process water from this operation flowed in a closed loop with no discharge (Ferrazzuolo, October 24, 1972).

After a lengthy review, NPDES permit No. NJ002429 was issued on April 26, 1974, requiring installation of additional treatment equipment and upgrading of the existing settling lagoons (USEPA, April 26, 1974). NGC proposed installation of a total recycle system to eliminate discharge from asbestos shingle manufacture (Beggs and Pyarilal, January 7, 1975).

However, instead of installing the systems, NGC elected to close the Millington plant permanently in May 1975, citing economics and environmental constraints as the cause (Schmidt, May 21, 1975).

In 1976 the plant site was sold to TIFA, Ltd. (Schwartz, May 22, 1981). TIFA, Ltd. is engaged in the manufacture of pesticide application equipment. In addition to their manufacturing facility, TIFA leases office space to two printing shops, an extruder of silicon wafers, an insurance company, a geologist, an auto parts dealer, a cosmetics dealer, and an oil company. The latter is in the process of vacating the premises. TIFA handles all solid waste from its tenants through the services of a private hauler.

Great Swamp Site

The Great Swamp Site consists of a hiking trail and an area of about 11.5 acres (500 feet x 1,000 feet) within the Dietzman Tract of the Great Swamp National Wildlife Refuge. The area has been backfilled to an undetermined depth with asbestos shingles. The presence of the remains of pallets and metal bands suggests that the shingles may have been dumped into the swamp in units.

The concern at this site is that the area is open to the general public and that they may be unknowingly exposed to a respiratory hazard from the decomposing shingles. A few rusted drums were noted in the swamp surrounding the shingle dump during a recent site reconnaissance, suggesting that materials other than shingles may have been dumped at this site.

Pine Valley Tree Service Site

This site is located along New Vernon Road, about one mile north of Meyersville. The site is privately owned and consists of a house presently undergoing renovation, an outbuilding, and a driveway paved with asbestos shingles. A larger dump area may be present at the end of the drive, but this has as yet not been verified. An area immediately behind the house may have also been covered with shingles, but is

now being regraded and covered with soil in preparation for the establishment of a lawn.

No hazardous materials other than asbestos shingles are known to have been disposed of at this site.

White Bridge Road Site

This Site is located at 651 White Bridge Road, also in the Meyersville vicinity. Asbestos shingles may have been used to pave a horse training area, and a driveway leading into the site. The site lies adjacent to Black Brook, a tributary of the Passaic River.

No hazardous materials other than asbestos shingles are known to have been disposed of at this site.

2.1.2 Regulatory and Remedial Actions to Date

Millington Site

In 1971 the NGC applied to the U.S. Army Corps of Engineers (COE) for a discharge permit to discharge approximately 70,000 gallons per day (gpd) of process wastewater from asbestos shingle manufacture to the Passaic River (Tucker, June 25, 1971). This application was ultimately approved as NPDES permit No. NJ002429 on April 26, 1974, as noted above, with an expiration date of April 30, 1979 (USEPA, April 26, 1974).

On January 25, 1977, NGC was cited by the NJDEP, Bureau of Flood Plain Management (BFPM), for an unauthorized fill along the Passaic River, and requested to remove the fill or submit a stream encroachment permit application (Schwartz, May 22, 1981).

The permit requirement was dropped on November 22, 1977, because George Reilly, former Millington Plant Manager, had indicated in a sworn deposition (Reilly, September 27, 1977) that NGC had discontinued disposal of asbestos waste on the asbestos hill shortly after acquiring the property. His deposition noted that NGC had actually engaged a private landscaping contractor to revegetate the site.

TIFA was granted an occupancy permit by the Millington Planning Board on October 11, 1977. TIFA had purchased the property in 1976 from NGC. It is of interest to note that the Millington Planning Board reserved the right to revoke the occupancy permit in the event that TIFA did not abide by NJDEP requirements at the site.

On February 16, 1978, the NJDEP Solid Waste Administration (SWA) issued an administrative order to NGC requiring remedial action to correct areas of exposed asbestos waste on the pile and submission of a plan for long-term resolution of the problem. Both of these actions were to have been completed within 30 days of the order (Tylutki, February 16, 1978). In response to the order, NGC submitted "Engineering Report 78M-1," which called for re-routing the drainage from the office complex area around the pile and stabilization of the pile itself by resoiling and establishment of effective vegetative cover (Unknown, April 1978).

The SWA rejected the initial plans on the grounds that they did not address all of the problems on the site. Following onsite discussions, NGC submitted revised plans on June 9, 1978 (Chheda, June 9, 1978). Due to the requirement for a stream encroachment permit, which was finally approved on September 29, 1978, approval of NGC's engineering plans were delayed. Final approval from the SWA came on October 10, 1978 (Tylutki, October 10, 1978).

NGC initiated the construction work in early December, but was barred access to the site by TIFA on or about December 11, 1978. TIFA refused to permit the work to proceed until the means of stormwater control was resolved to their satisfaction. They proposed a reinforced concrete pipe conduit around the asbestos hill, rather than an open, grass-lined channel (Seidel, January 12, 1979).

NGC and TIFA ultimately agreed in June 1979 to a settlement in which NGC would dredge sediment from the Passaic River and install a riprap berm along the toe of the pile for a distance of 350 feet upstream of Haas Road. In return, TIFA agreed to install a 48 inch reinforced concrete stormdrain to convey runoff from their plant facility around the pile (Witte, June 26, 1979).

NGC's remedial work was completed to the satisfaction of the SWA in late July 1979 (Edwards, August 15, 1979).

In 1980, TIFA began to regrade a portion of the dump surface for additional buildings and parking. According to Mr. Arnold Livingston (personal communication, November 2, 1983) about 1,000 truckloads of clean quarry fill were hauled onto the site and spread over a seven-acre area. The NJDEP SWA apparently viewed this as an unauthorized landfill and recommended issuance of a Notice of Prosecution (NOP). Issuance of the NOP did not take place at that time (Schwartz, May 26, 1981).

No further regulatory involvement occurred until late 1980, when public interest brought the Millington dump, as well as the three other dumps noted above, to the attention of the NJDEP Division of Hazards Management (DHM). NJDEP inspected the asbestos hill in December 1980 and noted large areas of exposed asbestos waste (Faherty, December 16, 1980).

The NJDEP inspected the Millington Site again on March 26, 1981 with the dual intention of identifying the nature of TIFA's operations and inspecting the asbestos hill. No evidence was found in this inspection to suggest that TIFA used any pesticides at the Millington plant in conjunction with their manufacture of pesticide application equipment. One or two well-defined trails were found across the outslope of the asbestos hill. Asbestos waste had been exposed along these trails. Other than these areas, the asbestos waste appeared well covered (Schwartz, May 22, 1981).

The Mitre ranking of this site was completed on August 6, 1982 (Bobal, August 6, 1982), and the site was proposed for inclusion in the National Priorities List (NPL) in December 1982.

On November 2, 1983, the NUS Remedial Planning Office (REMPO) conducted a site inspection. This survey aided greatly in interpretation of existing data and in developing the problem assessment contained in this Work Plan.

Great Swamp, Pine Valley Tree Service and White Bridge Road Sites

The possibility that these sites may have been used for dumping of asbestos shingles during operation of the Millington plant was first brought to the attention of the NJDEP BHM by a former employee of NGC in December 1980. While the greatest emphasis has been on the Millington Site, these potential secondary disposal sites were inspected by the NJDEP in December 1980, and again by the NJDEP Bureau of Site Management (BSM) in July 1983.

The Great Swamp Site was known to the NJDEP SWA in 1978. The literature includes notification of the U.S. Fish and Wildlife Service (USF&WS) on June 27, 1978, of the existence of the disposal site. (Tylutki, July 3, 1978). At this time a request was made to the USF&WS for remedial action, but no further action has been taken.

2.2 Environmental Setting

2.2.1 Landforms

The asbestos dump sites are located in the Piedmont Physiographic Province of the Appalachian Highlands. The province consists primarily of lowlands and rolling hills above which rise the ridges of the Watchung Mountains.

The sites are underlain by rocks of the Newark Group and by Pleistocene and Recent sediments. The Newark Group has two dominant members, the Brunswick

Formation and the Watchung Basalt. The Brunswick Formation consists of soft, red shales and sandstone beds. The Watchung Basalt is a series of three lava flows interstratified with the sandstones and shales of the Brunswick Formation. The ridges to the north and south of the site, Long Hill and the first and second Watchung Mountains respectively, are composed of the Watchung Basalt.

Superficial deposits in the vicinity of the site are unconsolidated clays, sands and gravels deposited during the Pleistocene and Recent Epochs. Thicknesses of these deposits vary depending upon the topography of the bedrock units underlying them.

With the exception of the Millington Site, where surface relief has been modified by the asbestos hill and the eroding action of the Passaic River, elevation changes are not abrupt. Elevations at the Millington Site range from about 210 feet mean sea level (MSL) near the Passaic Road, to 260 feet MSL in the vicinity of the TIFA office complex.

Most of the area associated with the three secondary dump sites is essentially level, at an approximate MSL elevation of 230 feet. As noted above, backfilling of shingles at the Great Swamp Site has created a level peninsula of elevated ground within the swamp.

2.2.2 Surface Water

Millington Site

All four sites lie within the Passaic River Basin. The drainage pattern is essentially dendritic, with Black Brook and Great Brook representing major drainages within the Great Swamp. The latter includes all three of the secondary dump sites. Great Brook and Black are actually interconnected within the main body of the swamp, as can be seen with reference to Figure 2-1, Site Plan.

Runoff from the asbestos hill, with a surface area of approximately 11 acres, drains directly into the Passaic River. In addition to surface runoff, a 48-inch

reinforced concrete pipe carries storm water runoff from the TIFA office complex around the asbestos hill, and discharges at the head of a marshy area along Haas Road to the south of the pile. This runoff joins the runoff from Haas Road in a natural drainway which parallels the township route and discharges to the Passaic River.

The Passaic River at this point supports a recreational fishery. Use of the river in the site vicinity is evidenced by trails worn into the outslope of the asbestos hill.

During the NUS/REMPO site reconnaissance in November 1983, a brief examination of the streambed indicated that it has eroded into native bedrock. Gravel and small boulders cover the streambed and are themselves covered with a heavy growth of algae. Inspection of the lower surface of the rocks revealed numerous mayfly (Ephemeroptera) and stonefly (Plecoptera) nymphs and other aquatic forms.

River depth was about 2 to 3 feet near the center of the channel during the site reconnaissance. Flow gradient is relatively shallow, and no impoundments were noted.

The Passaic Valley Water Commission (PVWC) operates a potable water supply intake at Little Falls, downstream of the site. Total population served by the PVWC has been estimated at 300,000 with two-thirds of the water supply drawn from the Passaic River (Unknown, circa August 1982).

The Commonwealth Water Company (CWC) operates an intake in the Passaic River approximately ten miles downstream of the Millington Site.

Great Swamp Site

The Great Swamp Site consists of approximately 11 acres which has apparently been formed by asbestos shingle disposal above the surrounding swamp. The site is essentially level, somewhat porous, and does not receive drainage from the

surrounding area, and the water table is close to the surface. Minimal surface runoff may be anticipated.

The site is flanked by Great Brook and/or portions of the Great Swamp drained by Great Brook. The dump site lies approximately 2.5 stream miles upstream of the confluence of Great Brook and the Passaic River.

Pine Valley Tree Service and White Bridge Road Sites

The Pine Valley Tree Service Site lies about 0.5 mile south of Black Brook. Due to the shallow depth to groundwater in this general area, infiltration or evapotranspiration of any surface water from the site would probably occur very rapidly and would minimize the potential for direct surface water impact from the site.

A portion of the surface runoff from the White Bridge Road Site may enter Black Brook, at a point approximately 2.4 stream miles upstream of its confluence with the Passaic River.

Reaches of Great Brook and Black Brook between the asbestos dump sites and the Passaic River are essentially uninhabited.

General Water Quality Standards

The portion of the Passaic River Basin upstream of Little Falls and downstream of Route 202 has been designated Class FW-2 waters in the "New, Revised, and Amended Rules Concerning Water Quality Standards" (NJDEP Docket No. 010-80-02, March 3, 1981).

Designated uses include public potable water supply, and "maintenance of the migration and propagation of the natural and established biota; primary contact recreation; industrial and agricultural water supply; and any other reasonable uses".

Specific physical and chemical water quality standards may be found in the regulations. However, specific instream criteria for priority pollutants have not yet been established. It is anticipated that the need for specific standards will be based upon the results of surface water sampling during the Remedial Investigation.

2.2.3 Geology

The Millington Site is underlain by the Triassic Brunswick Formation. The Brunswick Formation strikes NE and dips 10°-16° to the NW. This unit consists of red sandstones and shales. The shales are thinly bedded and fissile. In northern parts of the state these sediments become sandy and very conglomeritic. Local topography is influenced by bedrock structure. Soil formed from the decomposition of shales, is commonly a brownish-red silty-to-sandy clay. The site is bounded on the east by the Passaic River which has deposited a veneer of alluvium throughout the Millington Site. The thickness of the alluvium has not been determined.

2.2.4 Groundwater

Hydrogeology

Interpretation of hydrogeology is hindered by a lack of available data. Monitoring wells have not been installed at any of the sites. The lack of residential wells in the vicinity makes it difficult to obtain groundwater level information. Based on the regional hydrogeological data, the groundwater flow system occurs in the Brunswick Formation. The Brunswick Formation yields water almost exclusively from the fractures in the rock of which it is composed. Water probably flows through the formation most readily in vertical or near vertical fractures. The depth to the groundwater table in this shallow aquifer is probably between 20 and 30 feet below the ground surface. Shallow groundwater flow at the Millington Site is probably locally controlled by the Passaic River and direction of this flow is toward the river.

2.2.5 Land Use

Millington Site

The Millington Site lies within an area dedicated to industrial development within the southwestern sector of Millington, New Jersey. Areas to the north and east represent predominantly residential development.

Great Swamp Site

The Great Swamp Site lies within the Dietzman Tract in the Great Swamp National Wildlife Refuge. Land management practices are administered by the USF&WS. Public access is permitted for hiking, but no overnight camping or off-road vehicles are permitted.

At the present time, public access to the asbestos dump site is unrestricted.

Pine Valley Tree Service and White Bridge Road Sites

These sites are both privately owned and used for residential purposes. The Pine Valley Tree Service apparently uses an outbuilding adjacent to the residential dwelling on this site.

Little other information is available regarding each of these sites.

2.2.6 Climate and Meteorology

Northcentral New Jersey is characterized by a mild continental climate. The overall climate is influenced by the Atlantic Ocean, resulting in moderation of climatic extremes. These effects are especially pronounced when the wind is from the southeast.

Annual temperature and precipitation records for Newark, New Jersey, over the period from 1941 to 1981 have been summarized below. Precipitation is relatively evenly distributed over the year. Summers tend to be warm and humid, while winters are moderately cold. Severe snow storms producing in excess of four inches of snow per event occur infrequently.

Prevailing winds are from the south/southwest, and average 10.2 miles per hour. However during the months of January, February and March, winds tend to be from the northwest.

Average Precipitation and Temperature Data
Newark, New Jersey 1941 - 1981

Month	Mean Precipitation (In.)	Mean Temperature (Degrees F.)
January	2.91	31.4
February	2.95	32.6
March	3.93	40.6
April	3.44	51.7
May	3.60	61.9
June	2.99	71.4
July	4.03	76.4
August	4.27	74.6
September	3.44	67.8
October	2.82	57.5
November	3.61	46.2
December	3.46	34.5
Annual	41.45	53.9

2.3 Nature and Extent of the Problem

This section summarizes the available analytical data and discusses the extent of the problem. In accordance with the NCP, priority has been placed first upon documenting any hazard to the general public, and second upon addressing potential impacts to the ambient environment.

2.3.1 Environmental Concentrations

NGC monitored pH, temperature, total suspended solids (TSS), and discharge volume at their NPDES outfall No. 001, from June 1974 until April 1975. In addition, the Passaic River immediately upstream of their intake was monitored during August 1974.

As can be seen with reference to Table 2-1, the average monthly loading of TSS in the discharge water was 4.5 pounds per day at an average flow rate of 11,200 gallons per day (gpd). In other terms, the average TSS concentration in the discharge was approximately 49 parts per million (ppm).

In August 1974, the average TSS loading within the Passaic River upstream of the site was 3.3 lbs/day. Without an estimate of the discharge rate in the river at this time, TSS cannot be expressed in ppm for comparison.

The sampling history at the Millington and Great Swamp Sites has been summarized in Table 2-2. In general, all sampling concentrated upon asbestos fiber counts, and the only numerical data obtained was a result of sampling done by the NJDEP on April 4, 1978. In this sampling the following asbestos fiber counts were reported in fibers per milliliter:

Passaic River Upstream of the Millington Site	783
Passaic River Downstream of the Millington Site	590
Passaic River at Commonwealth Water Company Intake	590

TABLE 2-1

SUMMARY OF NPDES ANALYTICAL DATA,
OUTFALL NO. 001
MILLINGTON SITE
JUNE 1974 - APRIL 1975

Month	pH	TSS* (lb/day)	Flow (gpd)
June 1974	10.8	0.5	6,500
July 1974	10.9	8.8	--
August 1974	10.4	4.0	21,000
September 1974	10.9	10.1	22,000
October 1974	10.8	11.3	18,000
November 1974	10.9	10.2	25,000
December 1974	10.9	7.5	15,000
January 1975	11.0	1.7	17,300
February 1975	11.0	1.5	16,000
March 1975	10.7	1.4	12,000
April 1975	8.9	1.5	8,000
Average	10.8	4.5	11,200
Passaic River @ NGC intake (August 1974)	7.4	3.3	--

*TSS = Total Suspended Solids
Source: Compilation by NUS Corporation

TABLE 2-2

SAMPLING HISTORY
ASBESTOS DUMP SITE
MILLINGTON, NEW JERSEY

				Millington Site									Great Swamp Site	
Doc #	Sample Date	Sampler	Analysis	NPDES-001	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	Unknown	GS 1
2	6/74-3/75	NGC	pH,T,TSS,V	X										
3	3/75-4/75	NGC	pH,T,TSS,V	X										
4	4/75-5/75	NGC	pH,T,TSS,V	X										
6	1/17/78	SWA	A										X	
7	3/8/78	NJDEP	A		X	X	X							
8	4/4/78	NJDEP	A		X	X		X						
9	4/11/78	SWA	A											X
12	5/11/81	NJDEP	A						X*	X			X	X

Parameters
pH - pH
T - Temp
TSS - TSS
V - Volume
A - Asbestos
*Two samples

Sample Point Identification
001 NPDES Outfall 001
SW1 Passaic River Upstream at Basking Ridge Road/Maple Avenue Road Bridge
SW2 Passaic River Downstream at Stonehouse Road Bridge
SW3 Passaic River Upstream of Commonwealth Water Company Intake (downstream of site)
SW4 Passaic River at Route 24 Bridge
SW5 48-inch stormdrain discharge
SW6 Discharge from Culvert at Passaic River
SW7 Passaic River Upstream
SW8 Passaic River Downstream
GS1 Great Swamp

Source: Compilation by NUS Corporation

The EPA also apparently sampled the Passaic River and found 700 fibers per milliliter in the raw river water, and none in treated drinking water from the PVWC (Bishop, April 3, 1978; Tylutki, November 14, 1978).

No soil, air or groundwater samples are known to have been collected from the Millington Site.

Great Swamp Site

A single sample, presumably of the asbestos shingle fill material, was taken from the Great Swamp Site and analyzed for mineral composition. The method of analysis was not specified. The following percent composition was reported:

Chrysotile (asbestos)	15%
Brucite	10%
Rutile	5%
Calcite	40%
Alpha Quartz	25%
Total	95%

No other analytical results are available for the Great Swamp Site.

Pine Valley Tree Service and White Bridge Road Sites

No analytical results are available for these sites.

2.3.2 Public Health Concerns

Potential health risks associated with the four asbestos sites arise through potential exposures to airborne and surface water borne concentrations of asbestos fibers. Sampling of the Passaic River in the vicinity of the Millington Site indicates asbestos fiber counts ranging from 590 to 783 fibers per milliliter

(590,000 to 783,000 fibers per liter) in the raw river water, but none detected in treated drinking water from the PVWC. No data were provided for analysis of treated water from the CWC. Although inhaled asbestos is known to lead to asbestosis and respiratory cancer, it is not known whether asbestos in water may lead to the same or similar diseases. Sufficient data to evaluate the effects of asbestos on aquatic life is not available. In terms of human health effects, the USEPA has recommended a water quality criteria level of 300,000 fibers per liter corresponding to a lifetime cancer risk in humans of 1 in 100,000, although a fiber count of zero is preferable. The Passaic River samples clearly exceed this level, and may pose significant long-term health risk to any individuals using unfiltered Passaic River water as their drinking water supply. Further data on water treatment and usage is needed to assess the extent of risk to the public health.

Respiratory effects from airborne asbestos are more thoroughly documented. It is known that occupational exposure to inhaled asbestos fibers may lead to asbestosis, characterized by pulmonary fibrosis, pleural plaque formation, greatly increased risk of bronchogenic carcinoma, pleural mesothelioma, and peritoneal mesothelioma. Consequently, the Occupational Safety and Health Administration (OSHA) has recently issued an Emergency Temporary Standard (ETS) of 0.5 fibers (greater than 5 micrometers in length and with an aspect ratio of at least 3:1) per cubic centimeter of air, which replaces the previous 8-hour time weighted average of 2.0 fibers per cubic centimeter (f/cc). This new ETS will be in effect for six months as of November 4, 1983. All other applicable portions of the standard, such as the 10 f/cc ceiling limit remain unchanged. To date, no air monitoring data is available from any of the four sites. Such data is necessary before risks can be evaluated.

Because the asbestos shingles may have been treated with phenylmercuric acetate (PMA), there may be further risk through direct contact with the asbestos wastes. This substance is an organic mercury compound used as a preservative. Through direct contact it poses the risks of skin irritation, percutaneous absorption, and possibly skin sensitization. There are also classical signs of chronic exposures to this type of compound which include gingivitis (gum disease, sialorrhea (excessive

salivation), irritability, and muscular tremors. Further sampling of the asbestos wastes as well as the asbestos-contaminated surface waters is necessary to determine if the public is at significant risk due to the PMA.

2.3.3 Preliminary Health and Safety Requirements

For future work at the sites during the RI/FS, appropriate dermal and respiratory protection will be required in asbestos disposal areas. Dermal protection will include hooded, disposable coveralls, rubber boots, and disposable rubber gloves. Full-face chemical cartridge respirators equipped with particulate filters will be required when conducting soil borings, sampling and other related activities where airborne concentrations are not expected to exceed ten times the permissible exposure limit (PEL). For situations which are expected to produce contaminants above ten times the PEL, 29CFR 1910.1001 ((d)(2) will be consulted.

While performing activities likely to release airborne concentrations of asbestos fibers, air samples will be collected on 0.8 micrometer membrane filters from within the breathing zone of the personnel involved in those activities. The samples will be collected for the determination of the time weighted average, and the ceiling concentration. To reduce the possibility of asbestos dust generation, a water sprayer will be used to wet the areas of soil boring and sampling.

2.4 Previous Investigations and Evaluation of Existing Data

No summary reports are available for the sites in question. Most of the data is found in NJDEP memoranda.

Millington Site

The analytical results are accompanied by chain-of-custody information, but are, of themselves of little value since the laboratories of the New Jersey Department of Health were not properly equipped to identify the asbestos fibers using X-ray

diffraction and polarized light microscope (PLM) techniques (Cunningham, September 17, 1981).

Previous investigations have not attempted to focus upon potential offsite impacts via contamination of surface and/or groundwater by species other than asbestos fibers. Disposal of PMA has been alleged at this site, and soils may have become contaminated in the immediate vicinity of the lagoon which received effluent from the paint wash line.

The basic question of the pile's mass stability has not been addressed. Potential impact upon the aquatic habitat (i.e., the Passaic River) has not been considered.

Great Swamp Site

This site and the two privately-owned sites have not received significant attention in past studies. The Great Swamp Site was known to the NJDEP, SWA in 1978. However, disposition of the site was at that time left to the USF&WS. Existing data consists of a single sample of asbestos shingle material. No previous attempt has been made to evaluate possible groundwater contamination within the dump site, in spite of the fact that surface evidence (i.e., rusted drums) suggest that material other than asbestos shingles may have been disposed of at this site.

The previous investigations have not addressed potential health threats to users of the area as a result of inhalation of airborne asbestos fibers from the decomposing shingles.

No attempt has been made to verify allegations that NGC and/or its predecessors may have been responsible for the dumping at this site.

Pine Valley Tree Service and White Bridge Road Sites

These sites became known to NJDEP only in December 1980, and no investigations have been undertaken beyond site reconnaissance. Similar health concerns exist

for these sites as have been noted above for the Great Swamp Site. However, no evidence is available to suggest that material other than asbestos shingles has been disposed of at these sites.

2.5 Proposed Response

Two general categories of response at uncontrolled hazardous waste sites are recognized by the NCP. These are Initial Remedial Measures (IRM's) and Long-term Remedial Measures (L-TRM's).

IRM's are those activities which are undertaken in the event of a known, imminent threat to the general public, property, or the environment. Examples include erection of fences and/or warning signs, immediate removal of hazardous materials, and provision of alternate water supplies in the event of groundwater contamination.

The available information does not suggest that the NCP imminent danger criteria are met at any of the four asbestos dump sites. While airborne asbestos fibers may constitute a health threat at the Pine Valley Tree Service and White Bridge Road Sites, the onset of wetter fall weather and snow cover will reduce potential respiratory threats.

Thus far, no IRM's are mandated by the NCP at these sites.

L-TRM's comprise that category of remedial response which entail significant manpower and budgetary expenditures, and which are directed toward long-term resolution of the problem(s). L-TRM's are further categorized as source-control remedial measures (SCRM's) and offsite remedial measures. SCRM's are appropriate if the opportunity is still available to contain all or a major portion of the contamination at or near its point of origin at the site. SCRM's address contamination while it is still in a concentrated form.

Offsite remedial measures must be used to mitigate impact upon the ambient environment from contamination which has migrated away from the point of origination and thus have become somewhat dispersed.

In each of the present cases, the primary contamination problem is caused by deposition of asbestos in either the waste or shingle form. The decomposition of the asbestos shingles or exposure of the asbestos waste provides an opportunity for asbestos fibers to become airborne and thus causes potential health impacts via inhalation.

The public health and environmental impacts associated with waterborne asbestos fibers are unknown at present. The potential exists at the Millington Site for surface runoff to erode asbestos waste into the Passaic River. In turn, the Passaic River may erode the toe of the asbestos hill, especially during high river stage when the current riprap protection is overtopped.

The primary goal of remedial responses at these sites with respect to asbestos health threats will involve in-place stabilization of the disposal areas.

The basic question of mass stability within the asbestos hill needs to be addressed. Partial slope failure along the west-facing slope could result in severe impact to the Passaic River.

The potential for groundwater impact from other contaminants at the Millington and Great Swamp sites is presently unknown.

An RI/FS will be undertaken to resolve gaps in the existing data base at the Millington site, and to provide data suitable for evaluation of the problem and final identification of potential remedial technologies on all sites. The scope of this RI/FS is detailed in Section 3.

Those remedial alternatives which pass a screening phase will then be subjected to a Feasibility Study, and the recommended alternative(s) will be defined.

The Remedial Investigation will be guided by a preliminary definition of proposed responses. At the present time contaminants are not known to have migrated beyond the dump sites, and source control and stabilization appears to be a valid approach. The primary SCRM which may be proposed for the Millington Site in particular is stabilization of the asbestos hill. In the event that groundwater sampling indicates contamination by other species, it may be necessary to engage in groundwater treatment. The latter may involve in-situ detoxification or extraction of contaminated groundwater for treatment with return to the groundwater system.

3.0 SCOPE OF WORK

3.1 Introduction

Section 3 describes the manner in which the RI/FS will be conducted. The functional organization of the RI/FS is as outlined in the USEPA Work Assignment, 45.2LA2.0. This section may be considered to represent the Scope of Work (SOW) for the RI/FS, all or part of which will be subcontracted by NUS Corporation as the Zone I EPA Superfund contractor.

The overall RI/FS will generally occur in three phases, and will encompass 25 individual task elements.

The first phase, described in Section 3.2.1, includes Tasks 1 through 12 and represents Initial Activities within the RI.

The second phase, described in Section 3.2.2, includes Tasks 13 through 19. Of these, Tasks 13 through 16 are associated with field data acquisition. Phase II of the RI is considered to represent Site Activities.

The remaining Tasks 20 through 25 comprise Phase III, the Feasibility Study, which is described in Section 3.3 The tasks within the RI/FS are operationally described below.

It is emphasized that the Scope of Work presented herein is preliminary and subject to revision. As new data are collected and evaluated it is possible that problem definition and potential remedial alternatives will undergo modification, which may require corresponding changes in the scope and direction of this RI/FS.

3.2 Remedial Investigation

3.2.1 Initial Activities (Phase I)

Task 1 - Subcontractor Work Plan Review

This detailed Work Plan has been prepared as an initial draft by NUS Corporation. The Work Plan provides a coordinated management plan for conducting the various tasks anticipated within the RI/FS. In so doing, it addresses project organization, task assignments, manpower and resource requirements, project schedule, and budgetary control.

The Pool Subcontractor will review a final version of this Work Plan following incorporation of review comments on the initial draft by EPA and NJDEP. Any revisions will be discussed with NUS Corporation and EPA and incorporated as modifications to the subcontractor's statement of work only upon concurrence by EPA and the contractor.

The need for modifications in the Work Plan is also anticipated during the course of the RI in order to make certain that the RI remains responsive to its original goals as well as to the data requirements of the FS. The FS portion of the work plan will be re-evaluated upon completion of those phases of the RI prerequisite to initiation of the FS. This stage of the work is represented by Task 19 below.

Task 2 - Subcontractor Project Management

The Pool Subcontractor will designate a project manager to serve as the primary contact with EPA and NUS, as well as with other interested parties. The project manager will interface directly with the NUS Remedial Planning Office (REMPO) project manager and senior technical staff to provide current financial and progress status reports, and to identify and resolve any potential problems as expeditiously as possible.

The Pool Subcontractor will also assemble task-specific project teams under the direction of the Pool Subcontractor project manager and will provide senior technical support as required to ensure timely resolution of any problems and completion of tasks on schedule.

Task 3 - Community Relations Support Functions

As a basis for understanding community interest and concern about the four dump sites in the Millington vicinity, a preliminary assessment of community attitudes will be made. This will involve reviewing the files of the NJDEP, EPA, Region II and the Morris County Health Department and contacting the respective staff for updates on file information. This information will become the basis for development of a mailing list. Potential locations for public filing of fact sheets and other information will be defined. During the RI/FS work, staff will monitor community attitudes as reflected in media coverage of local events.

Following completion of the RI/FS work, a public meeting program will be developed including news releases and mailings of findings. Appropriate local contacts will be identified to assure adequate distribution of the work product. Two public meetings will provide a forum for local reaction to the work product. Audio visual programs will be produced as needed to ensure a complete, understandable product. A summary of the comments received at the public meetings will also be provided.

Task 4 - Collect and Evaluate Existing Data

No RAMP has been prepared for this site. The current work plan has attempted to summarize existing data. The latter consists primarily of NJDEP memoranda and site investigation reports.

Prior to initiating work, however, it will be extremely valuable to compile archival aerial photos available from the NJDEP Bureau of Geology, the USDA Agricultural Stabilization and Conservation Service (ASCS), the USDA Soil Conservation Service

(SCS) and other sources. Reference to these photos may provide information regarding the development of the asbestos hill and the dump within the Great Swamp.

In conjunction with this task, local officials and individuals with knowledge of the history of each of the sites will be interviewed.

Any other data essential to the planning and conduct of the RI will be obtained and reviewed in this task.

Exceptions to this will pertain to information specific to a given task. For example, property records information required for Task 8, Topographic and Boundary Survey, may be acquired as a part of that task, as described below.

Task 5 - Health, Safety and General Site Reconnaissance

Beyond providing an opportunity for field crews to become familiar with the site, goals of the general site reconnaissance are as follows:

- Initial screening of the site to define health and safety requirements for dermal and respiratory protection and to delineate areas of the site requiring specific levels of protection for field crews during the RI.

- Evaluation of respiratory hazards for the general public as a result of airborne asbestos fibers at the Great Swamp, Pine Valley Tree Service, and White Bridge Road Sites.

- Investigation of surface features, which is necessary for planning subsurface investigations.

The initial surface water and groundwater sampling will be conducted in concert with the general site reconnaissance so that background analytical data will be available as rapidly as possible for planning purposes.

Air sampling stations will be established at each of the three secondary disposal sites noted above and eight-hour samples of the ambient air will be collected to determine time weighted average airborne asbestos fiber concentrations.

These sampling activities have been discussed in detail in Task 15, Environmental Sampling and Monitoring.

In order to delineate the areas of asbestos shingle disposal at the Pine Valley Tree Service and White Bridge Road Sites and along the hiking trail at the Great Swamp Site, a portable power auger will be employed. The perimeter of each of the driveway and disposal areas will be defined and flagged for later field survey.

Samples of asbestos shingle material will be collected for mineral identification during the augering activity. Further definition of these sampling activities has been provided in Task 15.

Task 6 - Permits, Rights of Entry, and Other Authorizations

Conduct of RI activities at the Millington Site will require right-of-entry, authorization from TIFA, and possibly also from NGC in accord with their indemnity agreement with TIFA. Similarly, investigations at the Great Swamp Site will require right-of-entry authorization from the USF&WS, and activities at the two privately owned sites will require authorization from the owners. Ownership of the latter two properties and their respective boundaries will have been determined in Task 8, Topographic and Boundary Survey, prior to onsite activities anticipated in the Subsurface Investigations (Task 13).

A utilities search, with field verification during Task 8, will be undertaken in those areas where subsurface disturbance is projected. Any necessary permits or authorizations will be obtained.

Installation of monitoring wells will require permit authorization from the NJDEP, Bureau of Groundwater Management.

In the event that field treatability studies are required during the FS, NPDES discharge permits may be required.

It is anticipated that the EPA and NJDEP will facilitate the acquisition of necessary permits and right-of-entry authorizations.

Task 7 - Subcontractor Procurement

Competitive bids will be solicited from prequalified firms for each task to be subcontracted. The selection process will be in conformance with the guidelines established in Section 4.4 (Procurement).

Final selection and contract award will be contingent upon the approval of the EPA Contracting Officer.

Potential subcontracted tasks in the present work plan include the following:

- Topographic and Boundary Survey
- Subsurface Investigations (drilling and down hole geotechnical testing)
- Field Survey

Task 8 - Topographic and Boundary Survey

The most recent topographic mapping at the Millington Site is not suitable for final planning of the Subsurface Investigations (Task 13). In addition it is inadequate for conceptual design purposes in the FS.

A current topographic base map of the asbestos hill and its immediate vicinity will be generated by land survey. The base map will be prepared to NUS standard specifications at a suitable horizontal scale. The contour interval will be 2 feet.

The remaining sites do not require topography for the purposes of the RI/FS. For each of these sites, a plot plan will be prepared. The plan of the Great Swamp Site

will include the hiking trail and an adjacent parking area, and will be drawn to a suitable horizontal scale.

Plans of the privately owned sites will be drawn to suitable scales following definition of the extent of asbestos shingle disposal. These plans will include all areas of asbestos shingle disposal, as identified during the general site reconnaissance, and areas in the immediate vicinity to serve as points of reference.

All base mapping will be provided on 3-mil water washoff mylar with reversed image, and will be accepted subject to independent verification by NUS Corporation.

Property records will be researched for the Millington Site and the Pine Valley Tree Service and White Bridge Road Sites. Based upon property descriptions obtained, property boundaries will be surveyed in the field in conjunction with the field survey noted above. These property lines will be marked so that they can be easily referenced during subsequent field operations, and will also be transferred to the base mapping for each of the sites.

Permanent monuments will be established at each site to facilitate further survey work anticipated in Task 14.

Task 9 - Site-Specific Health and Safety Requirements

Site-specific health and safety requirements will be developed for further RI activities. These will be based upon all pertinent information gathered during Tasks 4 and 5, and will reflect the guidelines provided within the current version of the "NUS Superfund Division Health and Safety Manual".

The general health and safety objectives are as follows:

- To provide appropriate safety protection requirements and procedures for onsite field crews and subcontractors on a task-specific basis. This also

entails the demarcation of zones within the study area with respect to required minimum levels of protection.

- To ensure adequate training and equipment to perform expected tasks.

- To provide ongoing site monitoring to verify preliminary safety requirements and revise specific protection levels as required.

- To protect the general public and the environment by ensuring immediate detection of any potentially toxic releases during the RI/FS and providing adequate contingency plans.

Task 10 - Site-Specific Quality Assurance Requirements

Quality assurance requirements are defined in the "NUS Superfund Division Quality Assurance Manual". Applicable requirements will be selected specific to this project to provide guidance sufficient to govern the collection and dissemination of data and reports during the course of the RI/FS, as well as subcontractor activities.

Quality assurance requirements also pertain to the appropriate protocols in the collection, documentation, submission, and analysis of samples taken during the RI/FS.

Generation of the Site Operations Plan, discussed in Task 11, will provide task-specific work plans to guide site activities within the RI/FS. Included in these work plans will be the applicable quality assurance requirements for each task.

Task 11 - Site Operations Plan

A Site Operations Plan will be developed to outline the specific activities required in the completion of each task, or subtask, associated with site activities.

This plan will actually be an assemblage of work plans for the various activities. While it may be initially developed as an overview at the outset of the RI/FS, the specific characterization of each activity will be performed immediately prior to its execution. In this manner, the development of the Plan will remain flexible and responsive to the project requirements and will be based upon the most current data.

The Site Operations Plan will incorporate the applicable health and safety and quality assurance requirements in the development of the individual task work plans.

The Site Operations Plan will specify the organization of the command post for each task and will specify the responsiblities of each individual serving on the field team. It will also address disposal of any hazardous or potentially hazardous materials encountered during site activities.

A copy of the Site Operations Plan will be available to each of the members of the field team for review and comment prior to initiation of each respective site activity task.

Task 12 - Mobilization of Field Equipment

Task 12 pertains to mobilization of major equipment used for a number of tasks. Mobilization of equipment specific to a particular task, such as health and safety equipment and monitoring instrumentation has been included in the appropriate task.

If necessary, a field office/equipment storage trailer will be placed at the Millington Site during site activities at all four sites. If field studies are required during the FS, the field office may be required at that time as well. Since the latter are not envisioned at the present time, no provision for a field office during the FS has been made in the current budget estimate.

In conjunction with establishment of the field office, this task also includes provision of necessary utilities.

In addition to mobilization of major equipment, time has been provided in this task for administration of equipment needs. This includes check-in and check-out of equipment, repair of damaged equipment, and procurement of replacement units when necessary.

Mobilization costs have not been included for subcontract activities, such as drilling operations. The subcontractor will assume responsibility for mobilization of the equipment required to complete any subcontracted tasks.

3.2.2 Site Activities (Phase II)

Task 13 - Subsurface Investigations

The need to evaluate subsurface hydrogeology is indicated in the case of the Millington Site and the Great Swamp Site, both because the dumps are relatively extensive, and because there is evidence of disposal of materials other than asbestos waste or shingles.

Since past disposal practices at the privately owned sites apparently consisted only of dumping asbestos shingles, the groundwater contamination route is not considered significant and no hydrogeologic investigations have been proposed.

Hydrogeologic Investigation

Millington Site

A subsurface investigation is proposed to provide a detailed analysis of geologic and hydrologic conditions, site stratigraphy, and groundwater regimes. In order to define shallow groundwater flow, a series of six monitoring wells (nos. 901 to 906) is proposed for the site. One well (901) will be placed into bedrock to determine

background water quality data. The remaining wells will be placed in locations of possible areas of contamination. Figure 3-1 shows tentative placement of six monitoring wells. Each successive well will be located in the field based upon historic aerial photos of the site and results from the previous wells.

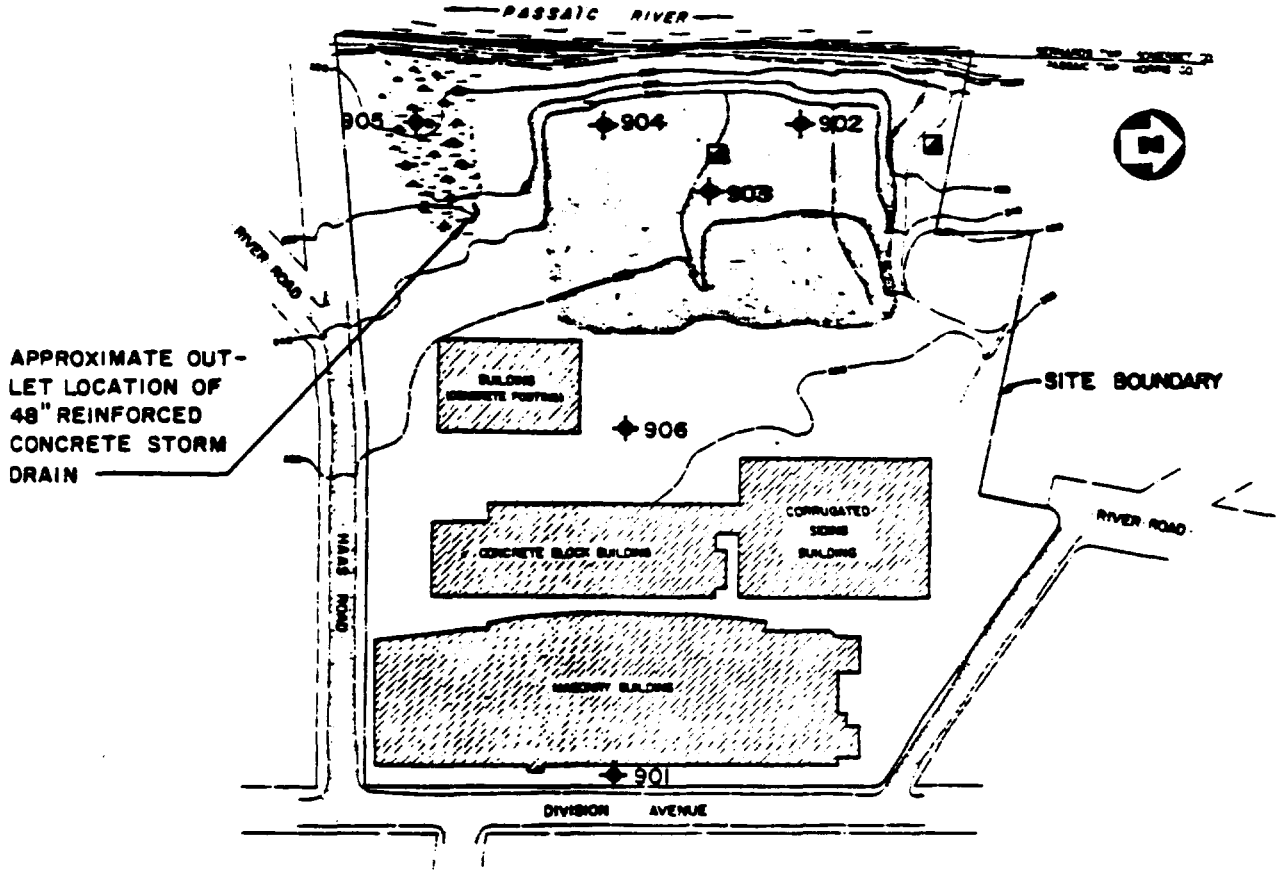
Well borings should be advanced to rock using hollow stem augers. Drilling will involve the use of six-inch outside diameter (OD) augers through the unconsolidated material, to bedrock. The augers would then be removed, and six-inch inside diameter (ID) casing will be spun into rock.

Standard penetration tests and split barrel sampling should be performed every 2.5 feet throughout the drilling process. Undisturbed thin wall tube samples will be collected at the discretion of the site geologist while drilling boreholes through the fill material at the asbestos hill.

The site geologist will maintain a detailed log of the subsurface conditions encountered. All split barrel samples will be classified in the field, placed in moisture-tight jars and stored for future reference. Well borings will be drilled approximately 10 feet below the water table (assumed to be 20 feet into bedrock for budgetary purposes), and will be designed to provide a 6-inch diameter hole, either with a core barrel or by reaming a smaller, cored hole.

Because of the question of pile stability only auger drilling will be acceptable above bedrock.

After the site geologist has determined the final screen elevation, monitoring wells will be constructed of 2 inch (ID) schedule 40 PVC pipe with five-foot manufactured PVC well screens. A protective steel casing with a locking cap will be placed around each well. The well will be constructed in such a way as to minimize contact with contaminated surface materials. After placement of each well into the borehole the annulus around the PVC pipe will be backfilled with pea gravel to 2 feet above the well screen. A 3-foot bentonite pellet seal will be placed above the pea gravel. The remainder of the hole will be backfilled with a



SOURCE: TAKEN FROM DRAWING Nº 6657; AUGUST 17, 1977; YANNACONE ASSOCIATES, INC. BERNARDSVILLE, NJ

BUILDINGS: TIFA, LTD. OFFICE COMPLEX

LEGEND

- PROPOSED MONITORING WELL LOCATION
- PROPOSED TEST PIT LOCATIONS
- APPROXIMATE LIMIT OF ASBESTOS HILL
- SWAMPLAND

PROPOSED SUBSURFACE INVESTIGATION
MILLINGTON SITE
ASBESTOS DUMP, MILLINGTON, NJ

SCALE 1" = 200'

FIGURE 3-1

NUS CORPORATION

A Halliburton Company

ASB 001 1345

bentonite cement grout after which the casing will be removed. This construction has been shown in Figure 3-2. As an alternative, the casing may be permanently grouted into bedrock with open hole monitoring well construction.

A groundwater evaluation program will be initiated upon completion of the monitoring wells. This program will consist of a series of falling head permeability tests. Aquifer characteristics will be evaluated to obtain a picture of the present and potential spread of contaminants in the groundwater.

Great Swamp Site

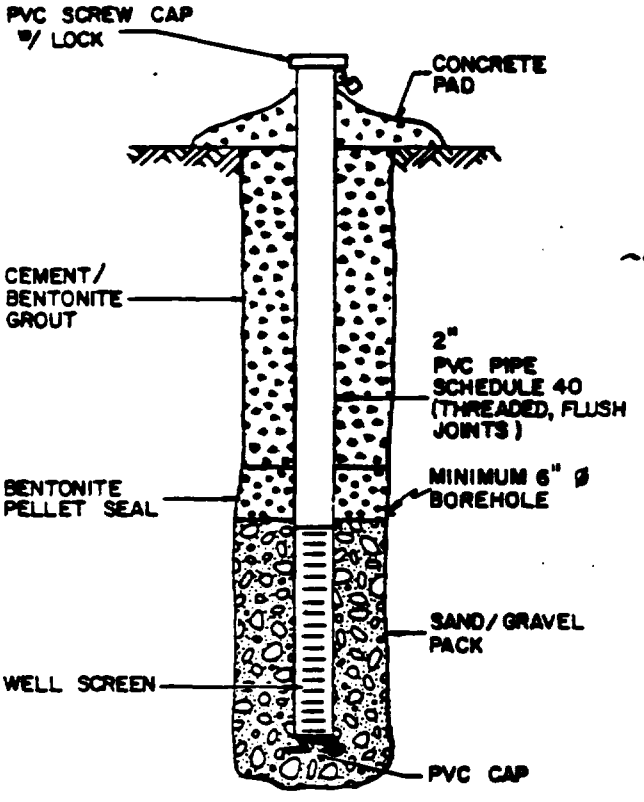
A series of 15 to 20 hollow stem auger borings are proposed for the Great Swamp Site. The aim of this investigation is to determine the depth and extent of the asbestos shingle fill. Logs of water wells in the Great Swamp indicate that 80 to 90 feet of sands, silts, and clays underlie areas near the sites. This material is glacial and lacustrine in nature.

Borings would be driven using an eight inch outside diameter hollow stem auger. Each boring will be approximately 5 feet deep. A well consisitng of a 2 feet slotted well screen (4 in. schedule 40 PVC pipe) with four feet of riser pipe and a locking cap will be installed into the hole. The hole will be backfilled with pea gravel to a depth one foot above the well screen. A one foot bentonite and a one foot concrete seal will follow.

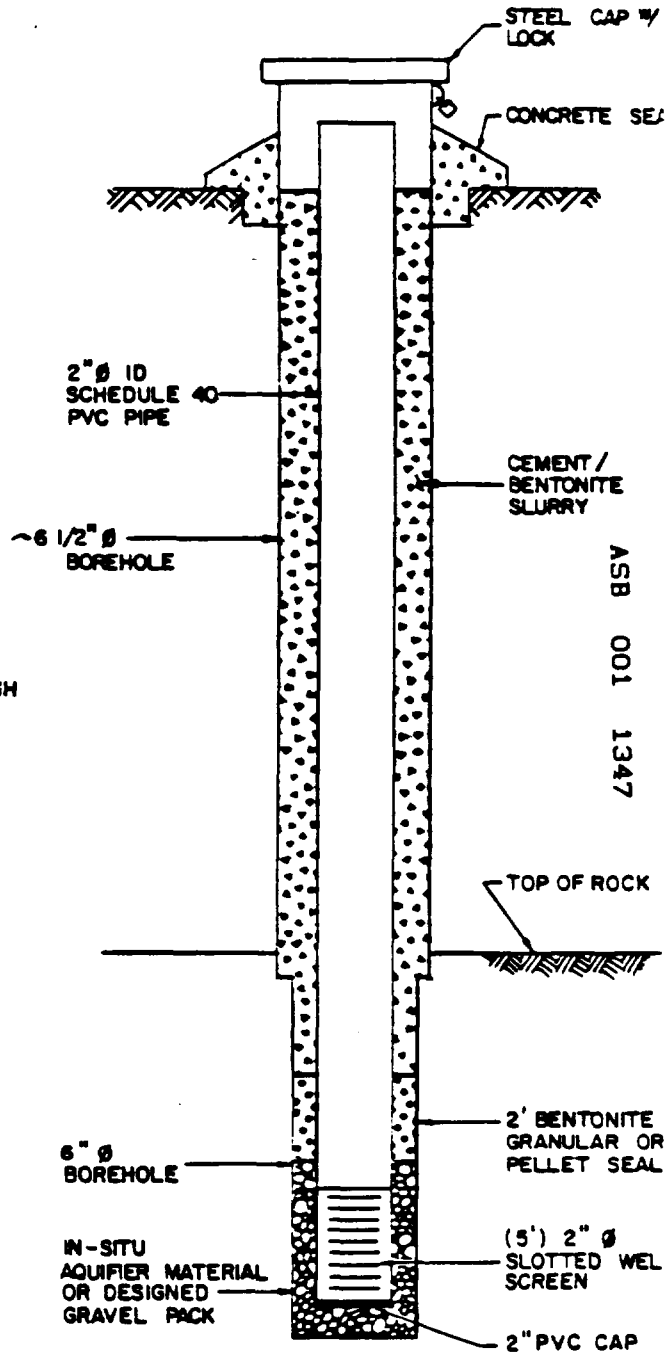
Engineering Investigation

An engineering/subsurface investigation program will be undertaken in the study areas in conjunction with the hydrogeologic investigation. This program will produce data to determine and/or define the following:

- The soil types and stratification
- The physical characteristics and properties of the materials at the sites



SHALLOW WELL
GREAT SWAMP SITE



DEEP WELL
MILLINGTON SITE

FIGURE 3-2

TYPICAL MONITORING WELL DESIGN
ASBESTOS DUMP SITE, MILLINGTON, NJ
NOT TO SCALE

NUS CORPORATION
A Halliburton Compar

- The interface characteristics between fill materials and in-situ materials
- The internal structure/condition of the fills
- The extent of materials placed at the sites
- The groundwater characteristics of the sites including water tables within the fills and drainage conditions
- The type and extent of contamination present
- The existence of any lagoon structures at the Millington Dump Site

The drilling program will involve the use of hollow stem augers at all study areas. Sampling will occur on a site-specific basis, as detailed below. The sampling methods shall include split barrel samples, Shelby tubes or other thin wall samplers for undisturbed sampling, and test pits. The NUS Quality Assurance Manual as well as specific guidance provided in the Site Operations Plan will govern sample collection and handling activities at all times. The samples will be described in the field using the Unified Soil Classification System (USCS).

Millington Site

This site is underlain by red sandstones and shales of the Triassic Brunswick Formation. The soil at the site, consisting primarily of brownish-red silty to sandy clay, was formed from the decomposition of the shales, and is covered by a layer of alluvium deposited by the Passaic River. The exact depths and thicknesses of these structures is not known at this time. It is assumed to be a shallow covering over intact rock, based on the evidence discovered during the November 2 REMPO site visit. The engineering investigation at this site will determine the types and properties of the spoil and in-situ materials, and the extent of these materials.

Hollow stem augers will be used during the drilling process, and advanced in such a manner so as not to cause excessive vibrations within the pile structure. The approximate borehole locations are shown on Figure 3-1. The exact locations will be determined by the site engineer and project manager based on the site information available at the time of drilling.

Shelby tubes or other undisturbed sampling devices will be used to obtain undisturbed samples at 10 foot intervals in the four boreholes on the pile proper (boring numbers 902, 903, 904, and 906, as shown in Figure 3-1). At this time, only tubes will be used to obtain test samples of the pile materials. Split barrel sampling will occur in the in-situ material beneath the pile, at 2.5-foot intervals to the top of rock. Shelby tube samples will be obtained in the in-situ soils at observed changes in stratigraphy. The standard penetration test will be conducted, and the samples will be monitored with an Organic Vapor Analyzer (OVA).

It is expected that approximately 12 Shelby tube samples will be taken from within the Millington Site asbestos hill. At the discretion of the site engineer, additional Shelby tube and split barrel samples may be taken and/or continuous sampling may be required.

It is recommended that boring numbers 903 and 906 be drilled first to obtain information about the asbestos pile. Based on this information, as well as reference to archival aerial photos, the locations of borings 902 and 904 can be adjusted. In all cases, boreholes should not be placed and equipment should go no closer than 10 feet from the crest of the slopes, to reduce the chances of slope failures.

The other borings at this study area will also be drilled using the hollow stem augers and split barrel samplers in the manner previously described. Shelby tube sampling and continuous sampling will be at the discretion of the site engineer.

Test pits will be used to detail the spoil and in-situ materials at the site. At present, two test pits are planned; one on the pile and one near the upstream side

slope in the in-situ soil. The pit into the in-situ soils will be to the top of rock (assumed to be approximately five feet, based upon the November 2 REMPO site visit), and will be constructed in a manner so as to be safe for personnel and not cause instability within the pile. The exact depth and location of the test pit into the asbestos pile will be determined by the site engineer and project manager.

Both test pits will be constructed in a safe and proper manner in accordance with the site operations plan and the site health and safety plan.

The amount and area of material placed will be determined from field reconnaissance and the samples taken during drilling. Samples for laboratory analysis will be obtained during the drilling program.

Great Swamp Site

The shallow hollow stem auger borings with split barrel samples taken every 2.5 feet will be conducted at selected locations around this site. The standard penetration test will be conducted, and the use of Shelby tubes and continuous sampling will be at the discretion of the site engineer.

Pine Valley Tree Service and White Bridge Road Sites

Based on the limited information available at these sites, engineering investigations do not appear to be required in these areas. However, if the site reconnaissance activities or future information warrant such studies, this work plan and costs should be modified to reflect such a change.

Laboratory Analysis - Engineering Properties

Laboratory testing will be required to determine the engineering properties of the spoil material and in-situ soil at the Millington Site, in order to permit an evaluation of the mass stability of the asbestos hill. The following tests are recommended for parameter determination:

- Atterberg limits
- Particle size analysis
- Specific gravity
- Moisture content
- Unit weight
- Triaxial compression strength testing

The basic tests (the first five listed above) will be required to classify the spoil materials and in-situ soils. Tests will be performed on samples selected by the site engineer or project manager.

Triaxial compression strength testing will be performed on the asbestos spoil material and in-situ soils. The strength parameters that are determined from these tests will be used in the analysis of the stability of the pile and the design of a recontoured and/or benched slope. At present, the materials are assumed to be homogeneous, and only two sets of triaxial strength tests are planned. Additional testing may be required if the materials are found not to be relatively homogeneous.

Future Borrow Material

Surface capping is a potential remedial technique at these sites. This technique may require extensive use of borrow material. At present, no sources have been identified. Evaluation of borrow material has not been included in the present work plan since the extent of the asbestos shingle disposal areas, and thus the quantity of borrow required, have not yet been determined. If this technology is considered as a remedial alternative, sources must be located, sampled, and tested in the laboratory for engineering properties. This may be undertaken via a modification in the work plan scope and attendant costs.

Decontamination Procedures

Decontamination procedures for drilling and sampling equipment will be specified in detail in the site operations plan. In general, however, equipment will be steam-cleaned prior to site entry, between each hole, and prior to exiting the site. Decontamination wash will be collected and characterized regarding hazardous characteristics prior to disposal. Due to the nature of the contaminants present at the sites, a requirement for special handling of decontaminated wash is not anticipated.

Task 14 - Field Survey

Following completion of monitoring well installation in Task 13, horizontal and vertical coordinates of all wells will be obtained.

The location of all wells will then be plotted on the base mapping prepared during Task 8, Topographic and Boundary Survey.

Permanent benchmarks constructed in Task 8 will facilitate location of the wells during this task.

Any other features noted during site activities requiring preservation on the base mapping will be surveyed at this time.

Task 15 - Environmental Sampling and Monitoring

For ease in summary and presentation in this work plan, all environmental sampling requiring laboratory analysis has been consolidated into Task 15. In practice, however, actual field sample collection will occur as follows:

Ambient Air	Task 5	Health, Safety and General Site Reconnaissance

Ambient Air (personal air sampler)	Task 13	Subsurface Investigations
Surface Water and Sediment	Task 5	Health, Safety and General Site Reconnaissance
Asbestos Shingle	Task 5	Health, Safety and General Site Reconnaissance
Subsurface Soil/Waste	Task 13	Subsurface Investigations
Groundwater	Task 13	Subsurface Investigations
Groundwater (monitoring)	Task 15	Environmental Sampling and Monitoring
Surface (monitoring)	Task 15	Environmental Sampling and Monitoring
Benthic Macroinvertebrates	Task 17	Aquatic Impact Assessment

The number of samples, collection techniques, and parameters to be included in the analysis have been outlined below by sample medium and site. Use of the Contract Laboratory Program (CLP) has been assumed for all analytical work, with the exception of engineering properties of soils and asbestos waste. In the event that the CLP cannot accommodate specific analytical or turn-around requirements, a contingency of approximately 20 percent of the total CLP analytical estimate has been allowed for non-CLP laboratory work in costing the present Work Plan.

Ambient Air

In order to obtain the required time-weighted average, air sampling will be undertaken in accord with methods approved by the National Institute of

Occupational Safety and Health (NIOSH) at areas of asbestos disposal and their general vicinities at the Great Swamp, Pine Valley Tree Service, and White Bridge Road Sites.

The method used will have to both identify asbestos fibers (i.e., distinguish them from other sample components with similar length and aspect ratio characteristics) and quantify the fibers to opermit computation of numbers of asbestos fibers per cubic centimeter of ambient air. Guidance from the EPA Air Quality Laboratory at Research Triangle Park, North Carolina, indicates that methods of choice for quantification of asbestos fibers in ambient air involve the use of Transmission or Scanning Electron Microscopy (TEM or SEM, respectively). Because of the cost of such analyses (approximate unit cost, $500) and the number of ambient air samples proposed for the Asbestos Dump RI/FS, the following compromise is being suggested. All of the ambient air samples collected at each site will be analyzed for asbestos fiber count (approximate unit cost $30). In addition SEM or TEM will be employed to verify two samples at each site which are indicative of "worst-case" conditions. If the fiber counts obtained by both methods are not in good agreement, additional SEM or TEM counts may be required in order to satisfy enforcement-related goals of the RI. Additional SEM or TEM work is not included in the present work plan budget.

The minerals identified in ambient air via SEM or TEM may be compared with mineralogical composition of shingle samples identified by X-ray diffraction.
No ambient air sampling has been anticipated at the Millington Site due to the fact that the asbestos waste appears to be adequately covered and thus incapable of air contamination.

The samples will be taken by use of a pump to draw air at a known rate through a methyl cellulose filter. At the conclusion of the exposure time the filter will be removed, and submitted to an approved laboratory for the required analysis. A field blank will be obtained in order to evaluate the validity of the results.

Specific sample locations will be identified in the field. Adequate stations have been proposed to evaluate (1) onsite air contamination, (2) contamination at points inhabited or frequented by the public, and (3) adequate offsite points to reflect offsite patterns of contamination. For budgeting purposes, however, the following numbers of samples have been proposed:

Great Swamp Site	14 samples
Pine Valley Tree Service Site	10 samples
White Bridge Road Site	9 samples
Trip Blank	1 sample
Total Number of Samples	34

It is important to note that weather conditions will have an important bearing upon the conduct of this work. Approximately 3-4 days of dry weather must precede the sampling. Any rainfall during the sampling would require interruption of the work until dry conditions return.

In addition approximately 16 samples will be taken during Task 13, Subsurface Investigations, for simple asbestos fiber counts, in order to evaluate exposure of the RI/FS field team to airborne concentrations generated during drilling.

Surface Water and Sediment

Surface water and sediment samples will be collected to define the extent of contamination in the Passaic River and its tributaries, Great Brook and Black Brook. Sampling points have been selected to represent background conditions in Great Brook and Black Brook above influence from the Great Swamp and White Bridge Road Sites, respectively, and "background" conditions in the Passaic River upstream of the Millington Site. Results from these locations will be compared to samples collected immediately downstream of each of these three sites.

Asbestos fiber counts in the April 4, 1978 NJDEP sampling were higher upriver of the Millington Site (783 fibers per ml) than downriver (590 fibers per ml). Sample locations have been defined within Great Brook and within the reach of the Passaic River downstream of its confluence with Great Brook to "track" the asbestos fiber counts in an effort to evaluate whether the Great Swamp Site may be responsible for elevated Passaic River asbestos levels in the Millington Site vicinity.

Sediment samples will be collected from the soft bottoms of Great Brook and Black Brook at both background points upstream and at a point immediately downstream of the dump sites. If possible, sediment samples will be taken from the Passaic River at White Bridge Road, and immediately upstream and downstream of the Millington Site. The bed of the Passaic River exhibited little or no siltation in the Millington Site vicinity during a recent site reconnaissance, and sediment samples may be difficult to obtain.

Samples will be obtained using either a coring tool or a dredge type sampler such as the Ekman or Ponar units designed for sediment sampling.

Preliminary sample numbers and locations have been summarized below and shown on Figure 3-3. Surface water and combined surface water/sediment sampling stations have been differentiated.

Passaic River

- Above confluence with Great Brook (2)
- Intersection with Lord Stirling Road (1)*
- Intersection with Maple Avenue (1)
- Immediately upstream of Millington Site (1)*
- Intersection with Haas Road (1)*
- Commonwealth Water Company intake (1)

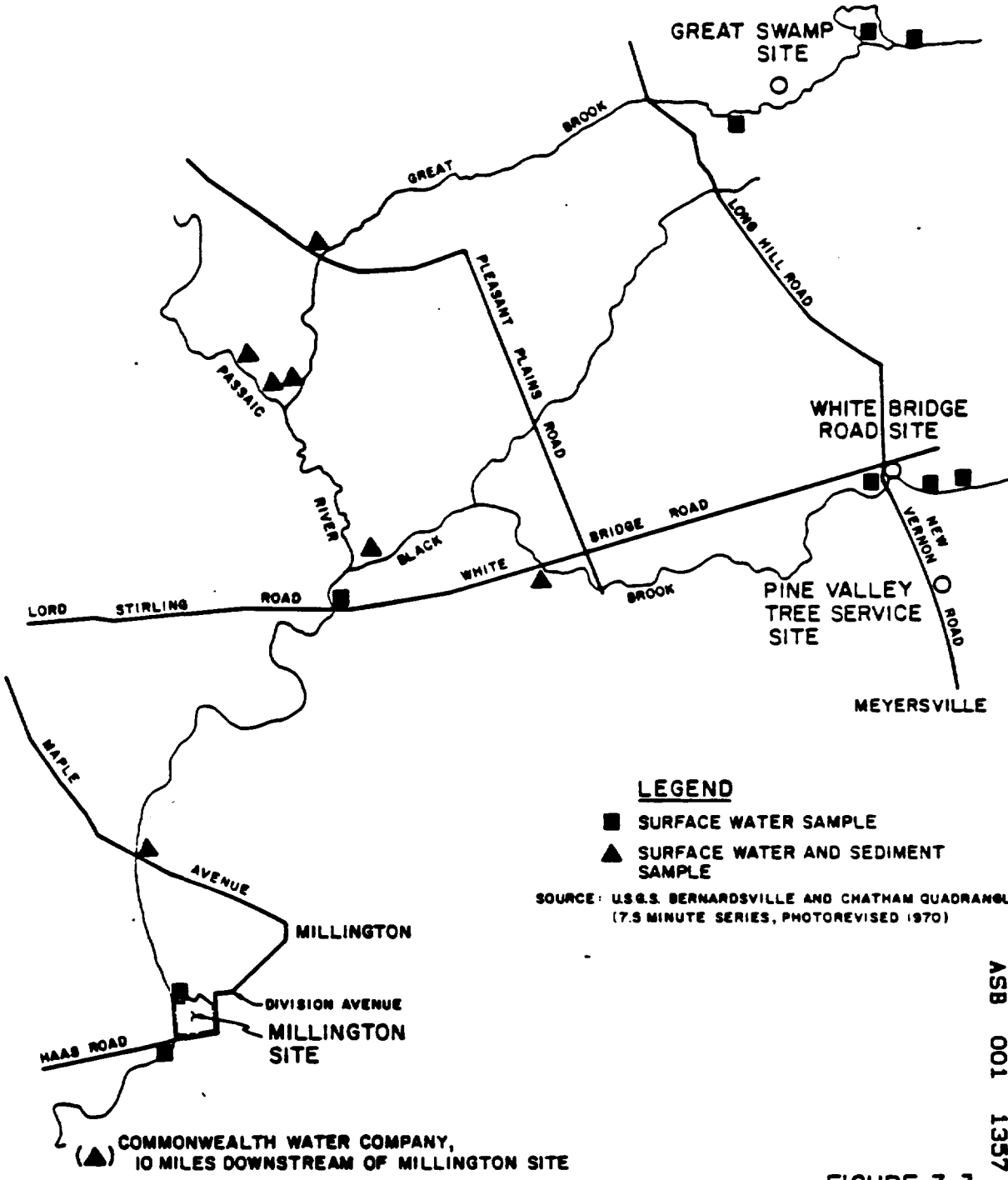


FIGURE 3-3

PROPOSED SURFACE WATER / SEDIMENT SAMPLE LOCATIONS
ASBESTOS DUMP SITE, MILLINGTON, NJ
SCALE 1" = 6,000'

NUS CORPORATION
A Halliburton Company

ASB 001 1357

Great Brook

- Upstream of dump site (2)*
- Immediately downstream of dump site (1)*
- Intersection with Pleasant Plains Road (1)
- Above confluence with Passaic River (1)

Black Brook

- Upstream of White Bridge Road Site (2)*
- Immediately downstream of site (1)*
- Intersection with White Bridge Road (1)
- Above confluence with Passaic River (1)

An attempt will also be made to sample the storm drain at the Millington Site during a rainfall event. The total number of surface water sampling points is therefore 18. Samples will be analyzed in the field for pH, specific conductivity and temperature, and will be submitted to an approved laboratory for Hazardous Substances List (HSL) Organics and Inorganics analyses and asbestos fiber count.

As noted above, nine sediment samples will be collected and will be analyzed for mineralogical composition via X-ray diffraction. Since a known quantity of sediment will be collected, calculation of actual quantities of asbestos minerals will be possible.

Asbestos Shingles

Samples of the asbestos shingles will be collected from Great Swamp, Pine Valley Tree Service, and White Bridge Road Sites and will be analyzed for mineral composition via X-ray diffraction or other equivalent means.

*Indicates sediment sample collection in addition to water sample.

These results will be compared with the mineral composition determined from samples of the asbestos waste taken from the Millington Site.

The potential exists via this comparison to identify anomalies in the composition of the asbestos shingles which would correlate with similar peculiarities in the composition of the asbestos waste. A positive comparison would serve to support the allegations that the Millington Plant was the source of the asbestos shingles found at the other three sites.

It must be noted however, that the confidence in this technique yielding definitive results is low. The potential exists that these studies may suggest further investigation, such as trace element analysis or identification of specific bonding compounds used at the Millington Site, which would persist in the shingle residue at the other disposal sites. Such studies are beyond the scope of the present work plan.

Samples of the shingles will be collected during the Health, Safety and General Site Reconnaissance (Task 5) at the privately owned sites, and along the hiking trail at the Great Swamp Site. These samples will be collected with a power auger during definition of the boundaries of asbestos shingle disposal.

Samples of the asbestos shingles will be obtained from the dump site within the Great Swamp during installation of monitoring wells.

The following numbers of composite samples have been anticipated, each representing a minimum of five individual sample locations.

Great Swamp Site	3 samples
Pine Valley Tree Service Site	2 samples
White Bridge Road Site	2 samples

Subsurface Soil/Waste Sampling

Subsurface soils will be sampled during the Subsurface Investigations at both the Millington and Great Swamp Sites. The sample collection procedure and rationale for submission of samples for analysis has been discussed in Task 13.

Approximately 16 subsurface soil samples are anticipated to require analysis for HSL organics and inorganics. Of these, four will also be analyzed for mineral composition.

In addition, at least 16 thin wall tube samples will require analysis for engineering properties.

Groundwater

Six monitoring wells will be installed at the Millington Site and 15 to 20 shallow wells will be installed within the Great Swamp Dump Site.

Evacuation of at least five well volumes prior to sample collection will ensure that fresh groundwater samples are obtained. In order to prevent cross contamination of the wells, bailers will be decontaminated between wells. The decontamination will involve rinsing with acetone followed by deionized water. Decontamination wash, as well as groundwater evacuated from the wells, will be drummed for classification regarding toxicity. Disposal methods will be dictated by the characterization of the material.

The initial sampling tour will occur immediately after installation of the wells and will involve the collection of approximately 26 samples for HSL organics and inorganics. No asbestos fiber counts are anticipated, since groundwater is not considered a significant environmental pathway for movement of asbestos fibers.

Surface and Groundwater Monitoring

Following the initial surface and groundwater sampling and analyses, general contaminant trends will be evident, and parameters indicative of the contaminants present may be identified. Instream water quality standards will also have been developed by the NJDEP.

Two subsequent sampling tours are projected in order to provide a suitable data base to define the presence or absence of onsite groundwater contamination at the Millington and Great Swamp Sites and to identify offsite surface water contamination.

At the present time it is anticipated that the sample locations noted in Task 15 will be replicated in each of the subsequent tours. Analysis will be for indicator parameters only, with field measurement of pH, conductivity, temperature, and flow, where applicable.

In total, collection of 50 groundwater and 36 surface water samples is projected.

Summary

Table 3-1 summarizes the sampling program with respect to numbers of samples and analyses. A cost estimate for the CLP portion of the program may be found in Table 5-3.

Analyses of all 20 well samples at the Great Swamp Site for the complete HSL scan may appear excessive, however, the wells are being utilized to define potential sources of groundwater contamination other than asbestos fibers. Use of the

TABLE 3-1

SAMPLING PROGRAM SUMMARY

Sample Type	No. of Samples	Analytical Parameter(s)
Ambient Air	34	AFC
	6	SEM/TEM
Surface Water	18	HSL
	18	AFC
Sediment	9	HSL
	9	MC
Asbestos Shingles	7	MC
Subsurface Soil/Waste	16	EP
	4	MC
	16	HSL
Ambient Air (personal samplers)	16	AFC
Groundwater	26	HSL
Groundwater (monitoring)	52	IND
Surface Water (monitoring)	36	IND

AFC = Asbestos Fiber Count by Polarized Light Microscope
SEM/TEM = Asbestos Fiber Count and Identification by Scanning or Transmission Electron Microscopy
HSL = Hazardous Substances Organics and Inorganics
MC = Mineralogical Composition
EP = Engineering Properties
IND = Indicator Parameters based upon HSL scans

hydrogeologic investigation as a reconnaissance technique, as opposed to geophysical or other methods, is considered cost-effective in light of the shallow water table and the quality of data obtainable by direct groundwater sampling.

As a final note, the only contaminant presently suspected at any of the sites in addition to asbestos fibers is PMA. Since direct analysis for this compound may be impractical, its presence will be inferred from a review of the HSL scan, and most particularly from the mercury levels found.

Task 16 - Aquatic Impact Assessment

The benthic macroinvertebrate community will be sampled at selected locations within Great Brook, Black Brook, and the Passaic River in order to investigate potential impacts from the dump sites.

The benthic community lies at the base of the aquatic food web. The organisms are relatively immobile and some nymphal forms such as mayflies (Ephemerophera) are highly susceptible to pollution.

As a result of these characteristics the benthic community reflects long-term impacts upon water quality in a much better manner than periodic grab samples of water or sediment.

In addition to evaluating the potential for biologically significant offsite impacts, the baseline studies anticipated in this task will provide a basis for establishing criteria for satisfactory remediation of offsite impacts, and evaluating the success of remedial techniques following their implementation.

Samples will be taken at each of the sediment sampling stations noted in Task 15. Where stream conditions permit, a stream bottom sampler such as the Surber sampler will be used. In the case of soft bottoms or where the Surber sampler is otherwise impractical, a bottom-sampling dredge may be used to collect a unit volume of sediment. In the event that the latter sampler is required, benthic

macroinvertebrates will be extracted from the sediment with the aid of a benthos screen. In either case, the specimens collected will be preserved in labeled glass vials for later examination.

Sampling in the Passaic River will be further augmented by sweep netting. This approach involves positioning a fine mesh net in a downstream location, and collecting aquatic forms dislodged from the substrate for a short distance upstream of the net. This technique may prove useful where the river stage exceeds the operating limit of the Surber sampler.

Species composition of the benthic samples will be characterized at least to the Order taxonomic level, and diversity and abundance indices will be determined for each sample. Statistical comparisons will be employed when possible to test the significance of observed differences in the indices among the various stations. Correlation between the indices and levels of contamination at each station will be made to evaluate the impact of the contaminants upon the benthic populations.

The species composition of each benthic sample will be reviewed to determine whether substrates are being differentially colonized by specific types of organisms. Life histories of the species will be consulted to assist in explaining any differential colonization noted. Special emphasis will be placed upon the identification of pollution-tolerance with respect to the range of physical and chemical contamination found at each station.

Evaluation of the resident benthic population at various points within the drainage system will provide the necessary data upon which to evaluate chronic impacts to the aquatic environment as a result of site activites. At the present time the need to carry the Environmental Assessment beyond the macroinvertebrate level is not anticipated.

Task 17 - Data Reduction and Evaluation

Following completion of RI tasks, data generated during the investigation will be used in the production of a report to be submitted following the completion of all RI tasks. A thorough analysis and summary of all site investigations will be prepared so that a complete, coherent, and comprehensive understanding of site conditions is achieved to support the Feasibility Study.

The data from previous investigations will be re-evaluated within the context of the new data obtained during the RI to characterize the groundwater, surface water, and engineering properties of the in situ soils and the asbestos processing spoil materials. The results of the evaluation will be used to determine the stability of the Millington Dump Site, and the extent of contamination of the soils, surface waters, and groundwaters in the vicinity of all the sites.

The significant contaminant pathways, as determined jointly by the Pool Subcontractor, NUS, and the EPA, will be identified and an assessment of exposure, as it relates to public health and the environment, will be made. The degree to which either source control or offsite actions are required to mitigate any threat to public health, welfare or the environment will be identified. The assessment will be sufficiently detailed to allow a decision regarding further remedial response to be made by the EPA at this point.

Task 18 - Identify Preliminary Remedial Technologies

Establish Objectives and Criteria

The results of the RI will clarify the extent of contamination and other hazards associated with the sites. To identify preliminary remedial technologies, the goals and objectives of site remediation must be clearly defined. Then, based on the extent of contamination and safety factors, the objectives must be established.

These objectives will be developed in conjunction with the EPA and the State and may include those such as the prevention of contaminant input into the environment and the mitigation of existing contamination. All objectives for site remediation will be consistent with the regulations set forth in the NCP.

Criteria to be used in the evaluation of alternatives, such as technical, environmental, and economic factors, must also be identified. The criteria for the evaluation of alternatives are expected to include:

- Reliability
- Implementability
- Environmental Concerns
- Safety Requirements
- Cost-Effectiveness

Factors implicit in the evaluation of remedial measures include: availability and cost of materials required for final construction; physical site limitations for construction activities; applicability of treatment technologies to the waste materials; long-term effectiveness of the remedial measure; long-term Operation and Maintenance (O&M) requirements; transportation requirements; and additional exposure hazards to the environment and public created by implementing a given remedial measure. All onsite and offsite remedial alternatives will be evaluated in comparison to a risk assessment associated with a no-action alternative.

Based on site-specific conditions, some evaluation criteria may be weighted more heavily than others. These criteria will be identified during the RI. The evaluation criteria will be reviewed with the EPA.

Identify Remedial Technologies

Appropriate remedial technologies will be identified based on the established site objectives. These technologies will be evaluated singly and in combinations to determine how well they meet the established project objective. Appropriate

remedial technologies may be grouped as required to constitute the remedial measure.

The identification process for remedial technologies will take into account the type of media contamination, the site-specific conditions (soils, geology, etc.), public health and safety concerns, and existing EPA and NJDEP Hazardous Waste and related regulations. Preliminary data indicates that contamination at the Great Swamp, Pine Valley Tree Service and White Bridge Road Sites consists primarily of asbestos shingles, while additional forms of contamination may exist at the Millington and Great Swamp Sites.

The remedial measures listed below represent a preliminary list of options based on the existing site information. The Millington Site will be examined with all of these options in mind, while the Great Swamp, White Bridge Road and Pine Valley Tree Service Sites will be examined based on selected options (See Table 3-2). Additional options will be examined for the latter sites if additional contamination is found during the RI. The list will be reduced or expanded, depending on the results of the site investigation. As an example, if surface and groundwater monitoring do not indicate chemical contamination on or offsite, groundwater collection and treatment will not be required.

The remedial alternatives identified at this time include:

- Removal and Proper Disposal of Contaminated Soil

  Excavating and disposing of the contaminated soil is one way to prevent additional leaching of contaminants into the groundwater and surface water. The extent of contamination and therefore the amount of soil to be removed will be determined in the RI. The soil removed from the site will have to be transported and disposed of properly. Once the contaminated soil is removed, clean fill material will be placed in the excavated areas. The site will then be graded and revegetated.

TABLE 3-2

PRELIMINARY REMEDIAL TECHNOLOGIES
ASBESTOS DUMP SITE, MILLINGTON, NEW JERSEY

Remedial Technology		Sites			
Category	Type	Millington Dump	Great Swamp	White Bridge Road	Pine Valley Tree Service
Engineering	Removal and proper disposal of contaminated soil and fill.	X	X	X	X
	Surface capping.	X(1)	X	X	X
	Surface grading and revegetation.	X	X	X	X
	Erosion protection	X			
	Surface and slope recontouring and benching	X			
	Retaining Structures	X			
Treatment	Leachate collection and treatment.	X			
	Groundwater collection and treatment.	X			
	Construction of groundwater barriers.	X			
	Surface water collection and treatment.	X			
Other	No action	X	X	X	X

(1) Surface capping will not be considered appropriate by itself as a remedial measure at the Millington Site. It will be considered in conjunction with or in addition to recontouring or benching the outslopes.

Source: Prepared by NUS Corporation

- Surface Capping

Surface capping is a remedial measure used to prevent surface water infiltration, control erosion, and isolate and contain contaminated wastes and volatiles. Natural materials, such as clay or silt, or synthetic liners constructed of materials such as PVC, butyl, or hypalon, may be used. The choice of sealing material and method of application is dictated by site-specific factors such as local availability and costs of cover material, the nature of the wastes being covered, local climate and hydrogeology, and projected future use of the site.

The subject of location and types of borrow material required and available to implement this option are not addressed in this work plan. If this option is selected for further consideration, a modification must be made to the work plan to accommodate the locating, sampling and laboratory testing of suitable borrow material.

Due to the nature and location of the asbestos hill at the Millington Site, this option will not be considered adequate without moderation of the existing outslopes.

- Surface Grading and Revegetation

Surface grading is used to reshape the surface of covered landfills in order to manage surface water infiltration and erosion. The choice of specific grading techniques for a given waste disposal site will depend on site conditions. A graded surface indirectly controls groundwater contamination by promoting surface runoff and reducing infiltration, therefore minimizing leachate generation. Revegetation is used to dry surface layers of land disposal areas through root uptake/evapotranspiration, reducing the volume of leachate generated and thereby also indirectly controlling groundwater contamination.

- Erosion Control

  At present, the riprap at the toe of the slope at the Millington Site is insufficient to protect the asbestos pile from erosion and sloughing during a medium to high flood.

  Erosion control systems will be examined in an effort to protect the slope from damage. Additional riprap, geotextiles, concrete mats, and other systems will be considered to prevent erosion, scouring, and undercutting of the slope. The system will be designed after a review of projected flooding in the Passaic River.

- Surface and Slope Recontouring and Benching

  This remedial action would provide a method to stabilize the embankment by reducing the overall angle of the slope. The slope would be designed based upon the engineering properties of the pile and the in-situ soils.

- Retaining Structures

  This alternative would provide stability to the pile through the application of a structure resistant to the movements of the slope. Concrete retaining walls, crib walls, gabions, and other methods will be examined as buttressing alternatives for the pile.

- Leachate Collection and Treatment

  Leachate collection systems consist of a series of drains that intercept contaminated liquid discharged from the site and channel it to a treatment facility or discharge point. Leachate treatment will be highly variable depending on the composition and strength of the leachate.

- Groundwater Collection and Treatment

  Groundwater collection and treatment is achieved by installing recovery wells which pump groundwater from the contaminated aquifers, treating the water, and returning it to the aquifer or discharging to surface waters. As with all methods which affect groundwater conditions, extensive investigation is necessary to determine the appropriate implementation procedures. Surface water discharge permits must also be obtained if necessary.

- Construction of Groundwater Barriers

  Groundwater barriers, constructed of bentonite slurries, cement or chemical grout, or sheet piling can be installed vertically to (1) prevent groundwater from migrating away from the site; or (2) divert groundwater so that contact with waste materials is prevented. The implementation of an impermeable barrier to control groundwater flow may cause an increase in the upgradient hydraulic head which would affect the rate of movement of groundwater. These effects must be investigated before recommendation of a groundwater barrier.

- Surface Water Collection and Treatment

  Surface water collection and treatment involves collecting surface waters originating from the site and treating them onsite or at a municipal treatment facility. Treatability studies must precede implementation of any surface water treatment scheme.

- No Action

  In all cases, as dictated by the NCP, the "no action" alternative must be considered in cost-effective analysis. The analysis must address both the environmental and financial consequences of such an alternative.

Task 19 - Prepare Remedial Investigation Report and Revise Feasibility Study Work Plan

Remedial Investigation Report

After completion of the field investigations, all pertinent field and laboratory data will be assembled into a detailed RI report. This report will include detailed descriptions of the following items:

- Objectives of the Remedial Investigation
- A description of the study areas, including soil types and depths, and the results of the laboratory testing.
- Geologic framework and subsurface geologic conditions in the vicinity of the sites.
- Hydrogeologic conditions at and in the immediate vicinity of the sites, including the depth of the aquifers and the rates and directions of groundwater flow.
- Groundwater and surface water quality in the study areas.
- Ambient air quality to determine public health risk
- Transport of the wastes by surface water in the vicinity of the sites.
- Extent of contaminated groundwater plumes with estimates of the flow time from the source to the aquifer (if possible), if such plumes are found to be in existence during the RI at the Millington or Great Swamp Sites or the other sites.

- The stability of the asbestos byproducts and spoil pile at the Millington Site.

- Supporting data, such as chemical analysis reports, logs, and monitoring well water level readings.

- Conclusions and recommendations of the study.

Maps, figures, and tables will be prepared to support the text.

Revised Feasibility Study Work Plan

The FS portion of this Work Plan will be revised in accordance with the data and information developed in the RI. The revised Work Plan will present a detailed schedule and budget for the activities to be undertaken. The major tasks of the FS are as follows:

- Identification and development of alternatives
- Initial screening of alternatives
- Laboratory and field treatability studies
- Remedial alternatives evaluation and preliminary FS report
- Conceptual design of the selected alternative
- Final report

3.3 Feasibility Study (Phase III)

The purpose of the FS is to identify and evaluate appropriate remedial measures and prepare a conceptual design of the selected alternative. The FS will be based on existing site information and information obtained during the RI.

Task 20 - Identification of Development of Alternatives

Subsequent to the evaluation of information obtained from the RI and the preliminary identification of remedial technologies (as described in Tasks 18 and 19), all appropriate remedial alternatives will be identified for the determined site objectives. Additional Remedial Alternatives will be considered for the Great Swamp, Pine Valley Tree Service and White Bridge Road Sites, if appropriate. New alternatives may be identified and examined for each of the sites. Each of these identified alternatives will undergo preliminary development. This preliminary development will be used in the initial screening task.

The selection of objectives for Identification and Development of Remedial Measures must be based on public health protection and site-specific conditions. The selection of objectives and criteria will consider:

- Nature and extent of waste migration and type of media contamination (air, water, soil)

- Local land use and protection of investigative teams and construction crews

- EPA and NJDEP Hazardous Waste Regulations, including NCP, Subpart F

Specific objectives will be determined after completion of the RI. However, based upon available information, the following preliminary objectives have been established:

- Public Health and Safety Assurance

  This includes protection of local residents, field crews, and future land users from the waste toxicity and physical damage hazards which include inhalation, oral and dermal toxicities, and explosion and fire potentials. Both short and long-term hazards are considered.

- Surface Water Protection - Control

  The migration of wastes, caused by surface water flow, leachate runoff, erosion, and flooding must be controlled.

- Effectiveness

  This will address the degree to which the remedial measure will reduce long-term environmental impact including air, surface and groundwater contamination, biological degradation, and impacts upon human health. The reliability of post-closure monitoring systems will be included.

  The ranking of relative effectiveness will depend largely on past performance of similar remedial measures. Best engineering judgment based on thorough knowledge of site conditions will be used where past experience is deficient.

- Costs

  This will include all capital expenditures and annual operating and maintenance costs associated with the remedial measure. Annual cost comparisons for each method will be performed by amortizing capital over a selected time period to determine equivalent annual costs. Present-worth costs will be used.

Task 21 - Initial Screening of Alternatives

The alternatives developed in Task 21 will be screened to eliminate alternatives that are clearly not feasible or appropriate prior to undertaking detailed evaluations of the remaining alternatives. This screening will be carried out in close coordination with the EPA and the NJDEP.

Three broad considerations will be used as a basis for the initial screening: cost, effects of the alternative, and acceptable engineering practices. More specifically, the following factors will be considered:

- Cost: An alternative whose cost far exceeds that of other alternatives will usually be eliminated from further consideration. Total cost will include the cost of implementing the alternative and the cost of operation and maintenance.

- Environmental effects: Alternatives posing significant adverse environmental effects will be excluded.

- Environmental protection: Only those alternatives that satisfy the response objectives and contribute substantially to the protection of public health, welfare, or the environment will be considered further.

- Implementability and reliability: Alternatives that may prove extremely difficult to implement, that will not achieve the remedial objectives in a reasonable time period, or that rely on unproven technology will be eliminated.

As with the selection of objectives, the site investigation findings will be used to develop an evaluation criteria weighting. Additional criteria are not anticipated; however, each of the criteria can be weighted to reflect the requirements of site-specific conditions. For instance, social/legal feasibility might carry more weight than risk, and this relative weighting can be reflected in the evaluation process.

Decisions on remedial action objectives and the weighting of evaluation criteria can be made after the site investigations have been completed and evaluated. Review meetings with the EPA and the NJDEP will serve to develop the final objectives and criteria.

Task 22 - Laboratory and Field Studies

After the RI has been completed and the remedial actions have been identified, it may be necessary to conduct pilot or bench-scale treatability studies to evaluate some of the recommended actions. This work would include any studies required to evaluate the effectiveness of remedial actions and to establish engineering criteria necessary for design and implementation. These treatability studies will be used to evaluate remedial actions applicable to the potentially contaminated media at the site including soils, groundwater, and surface water. Potential remedial technologies which may be investigated through pilot or bench-scale studies may include groundwater or surface water treatment, and sorption and desorption properties of soils. Literature review of treatment technologies will be used where possible.

Sorption and desorption reactions of local soils to contaminants will be studied for evaluation of the no action alternative. Two types of tests are proposed: adsorption isotherms and contaminant breakthroughs. The experimentation is proposed to evaluate the renovation/attenuation potential of the contaminated soil and the soils separating the contaminants from the receiving groundwater aquifer. The proposed studies will be based on the groundwater contamination results and the physical properties of the soils. Soil samples will be collected via Shelby tube sampling as discussed in Task 15.

Because these laboratory studies are linked directly to the prior performance of other Feasibility Study tasks, a separate Work Plan for any proposed laboratory studies will be submitted to the EPA for approval if such studies are warranted. The costs presented herein include only the preparation of the Work Plan.

Task 23 - Remedial Alternatives Evaluation and Preliminary Feasibility Report

The remedial alternatives that pass the initial screening will be further developed and evaluated so that the most cost-effective alternative(s) can be recommended

to EPA and the NJDEP. A preliminary report will be submitted to EPA and the NJDEP for approval and final selection of a remedial action.

The following is a breakdown of the subtasks involved in this phase of the FS:

Detailed Development of Alternatives

Alternatives which pass the initial screening step will be developed in greater detail. This development will include:

- Description of appropriate treatment and disposal technologies
- Special engineering considerations required to implement the alternative (e.g., pilot treatment facility, additional studies needed to proceed with final remedial design.)
- Environmental impacts and proposed methods for mitigating any adverse effects.
- Operation, maintenance, and monitoring requirements of the remedy.
- Offsite disposal needs and transportation plans.
- Temporary storage requirements.
- Safety requirements for remedial implementation (including both onsite and offsite health and safety considerations).
- A description of how the alternative could be phased into individual operable units. The description should include a discussion of how various operable units of the total remedy could be implemented individually or in groups resulting in a significant improvement to the environment or savings in costs.

- A description of how the alternative could be segmented into areas to allow implementation of differing phases of the alternative.

- A review of any offsite storage or disposal facilities to ensure compliance with applicable RCRA requirements, both current and proposed.

Environmental Assessment

An Environmental Assessment (EA) will be performed for each alternative. The EA will include an evaluation of each alternative's environmental effects, physical or legal constraints, and regulatory requirements. In addition, the EA will include an analysis of measures to mitigate any adverse effects associated with an alternative.

Cost Evaluation

A cost evaluation will be developed for all feasible remedial alternatives (and for each phase or segment of the alternatives). The cost will be presented as a present-worth cost and will include the total cost of implementing the alternative and the annual operating and maintenance cost. Both monetary costs and associated non-monetary costs will be included.

Alternatives Evaluation and Final Recommendation

Alternatives will be evaluated using technical, environmental, and economic criteria. At a minimum, the following areas will be used to evaluate the cost-effectiveness of alternatives:

- Reliability: Alternatives that minimize or eliminate the potential for release of wastes into the environment will be considered more reliable than other alternatives. Institutional concerns such as management requirements can also be considered as reliability factors.

- Implementability: The requirements of implementing the alternatives will be considered, including phasing alternatives into operable units and segmenting alternatives into project areas on the site. The requirements for permits, zoning restrictions, right of ways, and public acceptance are also examples of factors to be considered.

- Operation and Maintenance Requirements: Preference will be given to projects with lower O & M requirements, other factors being equal.

- Safety Requirements: Onsite and offsite safety requirements during implementation of the alternatives will be considered. Alternatives with lower safety impact and cost will be favored.

- Cost: The remedial alternative with the lowest total present-worth cost will be favored. Total present-worth cost will include the capital cost of implementing the alternative and the cost of operation and maintenance of the proposed alternative.

Based on the above criteria and evaluations, an alternative(s) will be recommended. The recommendation will be justified by stating the relative advantages over other alternatives considered. Evaluative considerations shall be applied uniformly to each alternative. The lowest-cost alternative that is technologically feasible and reliable and that adequately protects (or mitigates damage to) public health, welfare, or the environment will be considered the most cost-effective alternative.

Preliminary Report

A preliminary FS report will be prepared presenting the results of Task 20 through 22 and identifying the recommended remedial alternative(s). The report will be submitted to EPA and the State for approval and final selection of a remedial alternative(s).

All information specific to the remedial measure evaluation will be summarized and presented in a separate remedial evaluation report. That report, together with the above noted RI report, will be the basis for the conceptual design of the selected remedial measure.

Information to be included in the remedial evaluation report will include:

- Supporting references on the feasibility of the remedial measures chosen for evaluation.
- Specific procedures and supporting data used to rank each remedial measure for the evaluation criteria.
- The expected environmental effects of the remedial measure alternatives.
- Design calculations used in evaluating each remedial measure.
- Preliminary design drawings and sketches used to evaluate each remedial measure.
- Acceptable engineering practices related to the design and implementation of the remedial measures chosen for evaluation.
- The cost estimates for each remedial measure with appropriate references provided.

The report will be prepared in a format that will be agreed upon in the preliminary review meetings. All documents collected in the remedial measure evaluation will be organized in a project file and will be available for later reference.

All data developed during the FS needed to support the recommendation of specific remedial measures will be presented in the draft report. A risk assessment necessary to confirm or dispute a no-action alternative will be provided.

The Contractor will assist EPA, Region II in presenting the results of the FS to the State, the public, and EPA Headquarters. As a result of the cumulative comments from the EPA, the State, and the public, a Record of Decision (ROD) will be prepared by the EPA Regional Site Project Officer to identify the chosen remedial measure(s) to be implemented at the Asbestos Dump Sites. The contractor will provide the necessary assistance and/or documentation for preparation of the ROD.

Task 24 - Conceptual Design

A conceptual design of the selected remedial measure will be prepared for use in development of detailed construction plans. The design will be based on the findings of the RI and the remedial measures evaluation.

The conceptual design plan will include general arrangement drawings and specifications. The site investigation reports will be companion documents with the conceptual design plan. These reports will contain site information needed for construction design, such as test boring logs, borehole testing data, groundwater conditions, and soil, waste, and rock sample descriptions and analysis.

The conceptual design plan will include the following:

- The selected engineering approach with implementation schedule
- Any special implementation requirements
- Applicable design criteria
- Preliminary site layouts
- Budget cost estimates including operation and maintenance cost figures
- Operation and maintenance requirements
- Safety plan including costs
- Equipment and construction functional specifications

Any additional information required as the basis for the completion of the final remedial design will also be included. The review of portions of the Community

Relations Plan, to reflect the results of the conceptual design, may also be required.

Task 25 - Final Report

A final report will be prepared for submission to the EPA and NJDEP. The report will include the results of Tasks 20 through 24 and will include additional appended information.

Appended information may include, but will not be limited to:

- Summary of assessment of on and offsite contamination
- Summary of remedial measure evaluation
- Supporting data for chosen remedial measure(s)
- Detailed data analysis
- Site topographic map with ground control data
- General arrangement drawings of remedial measure
- Typical geologic and design cross-sections
- Typical design details
- Design report with supporting calculations
- Erosion and sedimentation control plans
- Construction health and safety plan

- Construction schedule
- Conceptual design drawings (Process and Instrumentation Diagrams and general arrangements)
- Preliminary cost estimates

4.0 MANAGEMENT PLAN

Section 4.0 of this Work Plan outlines the management plan which will be used to complete the Asbestos Dump Remedial Investigation/Feasibility Study (RI/FS). It is presently planned that the USEPA Work Assignment resulting from this Work Plan will be conducted by an RI/FS Pool Subcontractor under the supervision of an NUS Remedial Planning Office (REMPO) Project Manager.

The responsibilities of the REMPO Project Manager and the assigned NUS project team are detailed below in the Contractor Project Management Work Plan (Section 4.2).

4.1 Project Organization

4.1.1 Project Manpower Plan

Figure 4-1 outlines the structure of the Project Organization.

The Remedial Planning Manager, through the REMPO Director of Projects provides overall guidance and administrative support to the project, and also serves as the primary liason to the USEPA Project Officer at USEPA Headquarters. Assisting the Remedial Planning Manager will be a REMPO Regional Coordinator who serves as the primary liaison with the USEPA Regional Project Officer. The REMPO Project Manager works directly with the USEPA Regional Site Project Officer (RSPO) and is responsible for the day-to-day management of the Pool Subcontractor. All formal lines of communication wil follow this organizational framework.

The REMPO Project Manager will serve as the formal interface between USEPA-NUS and the Pool Subcontractor throughout the course of the project. Provisions will be made for direct interface opportunities between all team members in regard to completion of technical assignments. All communications which have a

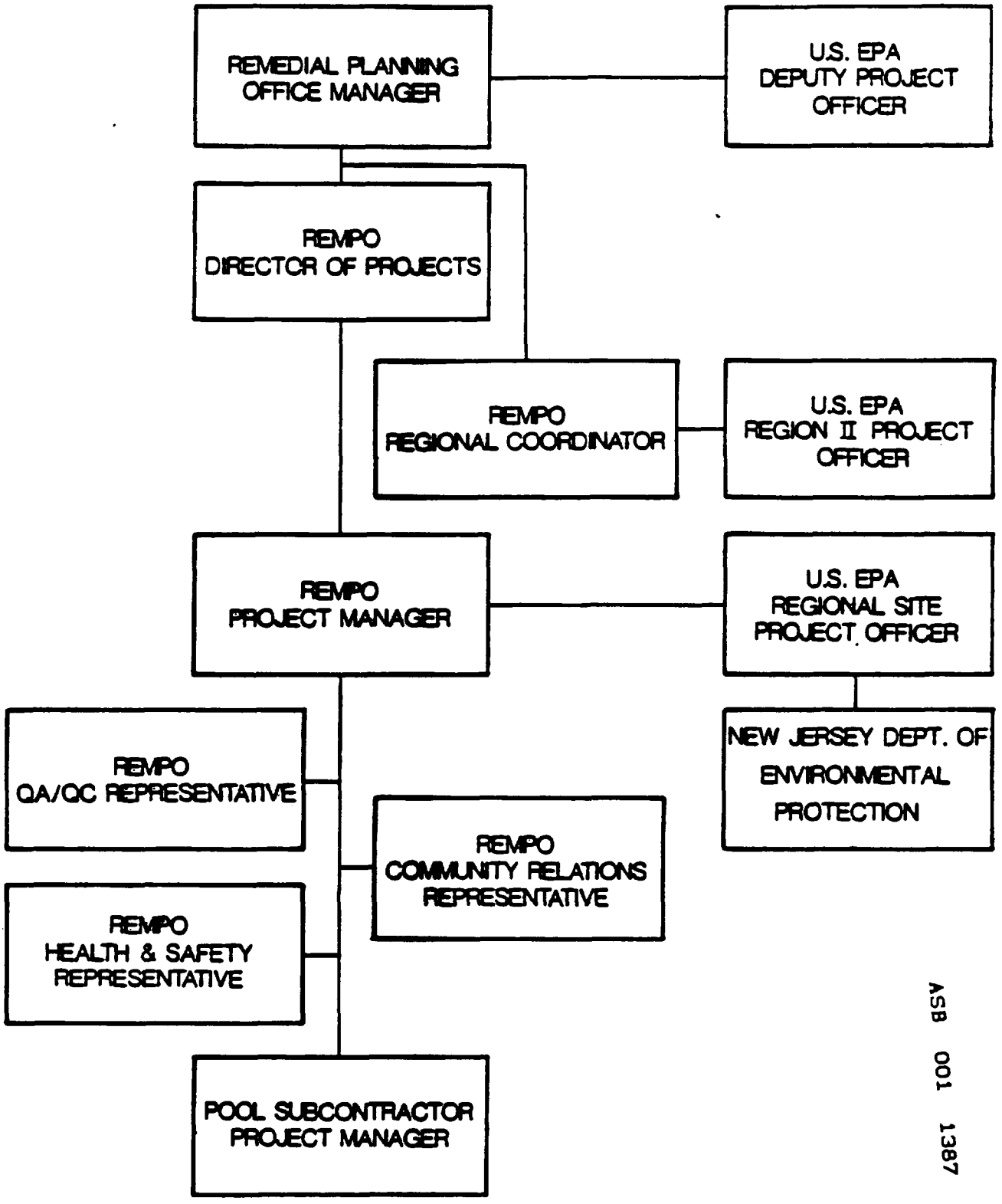


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FIGURE 4-1

PROJECT ORGANIZATION, ASBESTOS DUMP SITE
REMEDIAL INVESTIGATION & FEASIBILITY STUDY
MILLINGTON, NJ

NUS CORPORATION
A Halliburton Company

bearing on the Scope of Work, schedule and financial commitments specified in the final study plan will be completed through the REMPO Project Manager.

The REMPO Project Manager will initiate all work assignments and will monitor Pool Subcontractor performance for reference to the Final Study Plan scope of work, schedule, and financial specification including conformance with the approved Quality Assurance/Quality Control, Health and Safety and Community Relations Programs.

4.2 Project Management

NUS will manage this RI/FS project utilizing a work plan consisting of the following elements:

Task 1 Work Plan Preparatioin
Task 2 Subcontractor Procurement
Task 3 Project Initiation
Task 4 Quality Assurance and Health and Safety Support
Task 5 Subcontractor Management
Task 6 Overall Status Reporting
Task 7 Community Relations Support
Task 8 Project Close-Out

A summary of the elements of the Contractor project management work plan which will be implemented during this project are presented below.

Task 1 - Work Plan Preparation

The current Work Plan was prepared and is submitted by NUS Corporation as a first draft. Upon receipt of review comments from EPA Region II and the NJDEP, and completion of negotiations with a Pool Subcontractor, the Work Plan will be finalized as noted below.

Task 2 - Subcontractor Procurement

By means of previously USEPA approved procurement program, NUS has entered into Basic Ordering Agreements with a sufficient number and geographically diverse group of Pool Subcontractors to complete anticipated RI/FS Work Assignments throughout the contract period. Issuance of work assignments to the Pool Subcontractors will be completed in the following manner.

- USEPA issues work assignments to develop a Draft Work Plan.
- REMPO assigns Work Plan Project Manager to immediately initiate Draft Work Plan development.
- Prior to completion of the Draft Work Plan, senior REMPO management, in consultation with the REMPO Project Manager, determine the requirements for a Pool Subcontractor.
- The REMPO Project Manager continues to complete the Draft Work Plan. Simultaneously, REMPO senior management identifies potential Pool Subcontractor(s) for the work assignment, based on the identified requirements.
- The NUS Contracting Officer is advised of the Pool Subcontractor requirement and a request for proposal is scheduled.
- A solicitation request is prepared.
- The solicitation is forwarded to Pool Subcontractor(s) and the NUS Contracting Officer upon completion of the Draft Work Plan. The Draft Work Plan is simultaneously forwarded to USEPA for review and comment.

- The Pool Subcontractor proposal(s) is received by the NUS Contracting Officer. Proposals are reviewed by the Contracting Officer and REMPO Project Manager. The pool subcontractor is selected.

- The Pool Subcontractor is notified of selection and work assignment negotiations are initiated.

- REMPO receives USEPA and MDEQE comments on the Draft Work Plan. The REMPO Project Manager revises the study plan and notifies the Pool Subcontractor Project Manager of the revisions. The Pool Subcontractor is requested to revise his proposal in accordance with the revisions.

- The EPA Contracting Officer approves the procurement.

- Work assignment negotiations are completed with the Pool Subcontractor by the NUS Contracting Officer and the work assignment is issued.

- The REMPO Project Manager conducts a project initiation meeting with the Pool Subcontractor and the USEPA RSPO and assumes direct control of the Pool Subcontractor.

Task 3 – Project Initiation

Following completion of subcontractor work assignment negotiations, the REMPO Project Manager will schedule a project initiation meeting with the USEPA RSPO and Pool Subcontractor Project Manager. During this meeting, a final review of the work plan, project requirements, and assignment of tasks to the Pool Subcontractor will be completed. Formal lines of communication, with alternate points of contact, will be specified. A contact directory will be developed and correspondence identification and transmittal system specified. A file index system may also be specified depending upon the requirements for duplicate project files. A detailed schedule and logistical plan will be developed.

During the project initiation meeting the Pool Subcontractor will be provided with all necessary guideline and requirement materials to enable his project team to develop work assignment specific programs for Quality Assurance/Quality Control, Health and Safety and Community Relations. Approval to initiate development of these plans will be provided to the Pool Subcontractor by the REMPO Project Manager and a completion-review-approval schedule will be specified. Depending upon the schedule requirements of the study plan, additional tasks may also be approved.

Task 4 - Quality Assurance and Health and Safety Oversight

The REMPO Project Manager, with assistance from REMPO Quality Assurance/Control, and Health and Safety representatives will specify overall project requirements and will provide overall guidance to the Pool Subcontractor to develop work assignment specific programs. The Pool Subcontractor will develop the programs and will submit a draft of the program to the REMPO Project Manager for review and comment. The Pool Subcontractor will make any revisions indicated by the REMPO Project Manager review and will submit final program descriptions for approval. These programs will become an integral part of the Work Plan and will be used by the REMPO Project Manager in monitoring Pool Subcontractor performance.

Quality Assurance

The Pool Subcontractor will develop site-specific Quality Assurance Requirements for use in completing the work assignment. These requirements will be included in the Site Operations Plan. Quality Assurance shall be applied to both site and office activities. The Site Operations Plan must be approved by NUS prior to commencement of site activities. The Site Operations Plan will define Quality Assurance Requirements on a task-specific basis within the RI/FS. This plan will be reviewed and revised as necessary prior to the initiation of each activity to ensure that it contains the applicable Quality Assurance Requirements.

The quality assurance program to be applied to this project is a comprehensive program based on the quality assurance philosophy adopted by NUS when it was founded. The NUS President and Chief Executive Officer has promulgated a Corporate Quality Assurance Policy Statement that identifies the philosophy. This policy statement is the basis for the "NUS Corporate Quality Assurance Policy Manual" and for other manuals that direct each operating unit in the implementation of the quality assurance policy. Quality assurance is applied, as required to all NUS projects.

A general Quality Assurance Project Plan has been developed to delineate the quality assurance activities for the project, particularly for environmentally-related measurements.

NUS has prepared a Quality Assurance Manual to control project activity. The Quality Assurance Requirements (QARs) applicable to this site include:

QAR 3.0	DESIGN CONTROL
QAR 4.0	DATA ACQUISITION
QAR 5.0	PROCUREMENT DOCUMENT CONTROL
QAR 6.0	INSTRUCTIONS AND PROCEDURES
QAR 7.0	DOCUMENT CONTROL
QAR 8.0	CONTROL OF PURCHASED ITEMS AND SERVICES
QAR 9.0	IDENTIFICATION AND CONTROL OF LABORATORY SAMPLES (INCLUDES CHAIN-OF-CUSTODY)
QAR 11.0	INSPECTION
QAR 12.0	CONTROL OF MEASURING AND TEST EQUIPMENT
QAR 13.0	HANDLING, STORAGE AND SHIPPING OF HAZARDOUS SUBSTANCES
QAR 14.0	CONTROL OF NONCONFORMANCES
QAR 15.0	CORRECTIVE ACTION
QAR 16.0	QUALITY ASSURANCE RECORDS
QAR 17.0	AUDITS

The implementing procedures associated with the above QARs are also applicable, as are standard instructional procedures (Quality Control Procedures) for sampling, chain-of-custody, shipping and the like.

The relevant information from these documents, which is required by the subcontractor will be supplied by NUS. However, the entire manuals will not be supplied.

Health and Safety

A site-specific Health and Safety Plan acceptable to NUS, will be developed for the project by the Pool Subcontractor. Requirements for this plan will be developed as Pool Subcontractor Task 9 during the Remedial Investigation (RI). The health and safety plan for each field task will become part of the Site Operations Plan (Task 11).

Pool subcontractors performing RI/FS tasks are expected to provide their own health, safety and training support. Sufficient planning, materials, and expertise are expected to ensure that the Pool Subcontractor, their subcontractors (if any) NUS, and the government personnel as well as the environment are protected from harm during RI/FS activities.

Task 5 - Subcontractor Management

NUS by contractural requirements with EPA, will serve as the prime contractor for the project. The Pool Subcontractor will be managed by the REMPO Project Manager.

Subcontractor Monitoring

Statement of Work

The REMPO Project Manager will monitor the work of the Pool Subcontractor. As part of its proposal, the Pool Subcontractor will develop a project schedule indicating milestones for major events. Additionally, the Pool Subcontractor will estimate the number of manhours to be expended each month. Then, monthly, he will report the number of actual manhours utilized versus the estimate and will also provide an estimate of the percent completion of each task.

Schedule of Deliverables

The Pool Subcontractor shall be required to attend monthly meetings with the REMPO Project Manager. One (1) week prior to the meeting the Pool Subcontractor shall submit a progress report indicating manhours expended in the previous months, expenses for the month, anticipated invoice for the month, milestone events that were completed, schedule compliance, problems encountered and how they may affect milestone events, and solutions to the problems.

Preliminary draft reports for the RI/FS will be prepared by the Pool Subcontractor and submitted at least one month prior to the established due date for submission of draft reports to EPA. The preliminary draft reports will be submitted to the REMPO Project Manager for review and comment prior to a formal meeting. All comments and changes will be considered at this meeting. Clarification changes will then be given to the Pool Subcontractor in written form for inclusion in the final reports; however, changes in the technical content and/or Pool Subcontractor conclusions will not be made by NUS Corporation.

Reports

As indicated in Task 6, monthly progress reports will be prepared by the Pool Subcontractor in the format specified by NUS. Draft copies of the final report for

the RI will be submitted to NUS for review and comment. The final reports will then incorporate any clarifications or necessary changes.

Financial

NUS will have the responsibility for administering the Pool Subcontract and will review and authorize payment of invoices. The invoices will then be in sufficient detail and indicate manhours for each classification of person utilized on the project during the invoice period, and the hourly rate charged for each. Additionally, there shall be adequate documentation for other expenses such as second-tier subcontractor services, equipment, travel and living, etc.

Task 6 - Overall Status Reporting

Project Status Reports

Monthly progress reports will include the following information:

- Technical Progress Reports
  - Identification of project task and milestone
  - Status of work at the site and progress to date
  - Percent of completion (e.g., percent of task completed and work hours expended).
  - Difficulties encountered during the reporting period.
  - Actions being taken to rectify problems.
  - Activities planned for the next month.
  - Personnel changes.

The progress report will list target and actual completion dates for each project task, including project completion, and will provide an explanation of any deviation from the work plan schedule.

- Financial Management Report

  - Identification of project task

  - Actual expenditures, including fee and direct labor hours expended for this period.*

  - Cumulative expenditures (including fee) and cumulative direct labor hours.

  - Projection of expenditures for completing the project, including an explanation of any significant variation from the forecasted target.*

  - A graphic representation of proposed versus actual expenditures (plus fee) and comparison of actual versus target direct labor hours. A projection to completion will be made for both.

Status reports will be distributed monthly as follows:

Technical Progress Reports	Financial Management Reports	Addressee
2	2	EPA Contracting Officer
2	2	Zone Manager (EPA Headquarters)
2	2	EPA Regional Site Project Officer (Region II)
2	2	State Project Officer

*Indicates data required for input to EPA's Site Response Management System (SRMS). Standardized input forms will be provided for monthly dating of project shares.

Draft and Final Reports

A draft RI report will be submitted within thirty (30) days after the completion of all technical work. The report will incorporate the interim reports and summarize the results of all activities at the site. A final report including the error-free masters will be submitted within (30) days, following draft approval. A similar report procedure will be implemented for the laboratory and field studies work plan (Task 22) and the Preliminary FS Report (Task 23).

Meetings

Five meetings are being proposed between NUS, the Pool Subcontractor, EPA and the State in addition to the project initiation meeting. Meeting No. 1 will take place upon the conclusion of Phase I Initial Activities, and prior to mobilization at the site. The purpose of this meeting will be to review and verify the objectives and priorities of the investigation at the site. Planning activities for the RI will be reviewed in detail.

Meeting No. 2 will be held at the completion of the Subsurface Investigations (Task 13) to discuss the results of work to date and to determine what modifications to the work plan are required. The focus of the preliminary remedial alternatives will be discussed.

Meeting No. 3 will occur at the completion of the RI and after submittal of the Draft RI Report and FS Work Plan (Task 19).

Meeting No. 4 will be held after EPA and the State have received the Preliminary FS Report (Task 23). The purpose will be to discuss evaluation of the remedial alternatives and the EPA/State decision regarding the selected remedial alternative(s). Requirements for the Conceptual Design and Final Report will be reviewed.

Meeting No. 5 will be held after the Final Report has been submitted (Task 26). At this time all aspects of the project will be reviewed and finalized. These meetings have been shown on Figure 5-1, Remedial Action Schedule, in Section 5.

Performance Assessment

The performance of the Pool Subcontractor will be routinely evaluated and assessed by NUS to determine that all work has been performed in a satisfactory manner. Additionally the reports will be reviewed to ascertain that the terms of the subcontract have been fulfilled and that all the items included in the statement of work have been addressed.

Task 7 - Community Relations Support Functions

A Community Relations Plan (CRP) will be developed by the Pool Subcontractor in conjunction with Task 3. The role of the Contractor in community relations will be limited to providing support to the Pool Subcontractor and attendance at two public meetings to assist in disseminating information relative to the work.

At the present time, little formal input is anticipated until the conclusion of the FS.

Task 8 - Project Close-Out

Prior to final acceptance of the reports, the REMPO Project Manager will review the work to certify that certain items have been adequately covered by the Pool Subcontractor.

The documents and property of EPA or NUS will be recorded and returned to the proper source when the final reports are submitted and accepted.

Proper records will indicate documents held by the Pool Subcontractor and those returned to the agencies. The Pool Subcontractor must ensure that all records and other project information are returned to NUS or the government.

If any of the processes (or materials) recommended in the reports are covered by royalty payments and/or patents, the Pool Subcontractor will indicate this in the report.

A final audit may be performed to make certain that all charges, fees, and expenses are within the terms of the subcontract. The final release will address any assignment of refunds, rebates, or credits and the manner in which they shall be handled.

4.3 Change Orders

The monthly progress report will identify any unusual problems that may be upcoming in the project.

If forecasts predict that the work assignment budget or scope will change, written approval of the EPA Contracting Officer must be obtained. A written request for changes initiates this process. Written requests for Change Orders will be made by NUS Corporation. The Pool Subcontractor will support such requests with adequate written justification, as required by NUS Corporation.

4.4 Work Plan Modifications

Prior to initiating additional work or changes to the scope, the Pool Subcontractor must prepare written documentation explaining the reasons for modifications, including an estimate of labor-hours and cost involved. The REMPO Project Manager will review these requests and if justified, will prepare a request for additional funds from EPA. No additional work shall be performed until written authorization is received. No payment will be made for unauthorized work.

5.0 COSTS AND SCHEDULES

5.1 Project Schedule

Figure 5-1 graphically shows the project schedule broken down by project phases and tasks as well as by Contractor and Pool Subcontractor activities.

The schedule indicates a total of approximately 11 months required for completion of the 25 RI/FS task elements. In addition to the current Work Plan, major task deliverables requiring EPA review include the RI Report and Revised FS Work Plan (Task 19); a Laboratory and Field Studies Work Plan (Task 22); Remedial Alternatives Evaluation and Preliminary FS Report (Task 23); a Conceptual Design of the Selected Alternative(s) (Task 24); and the Final FS Report (Task 25).

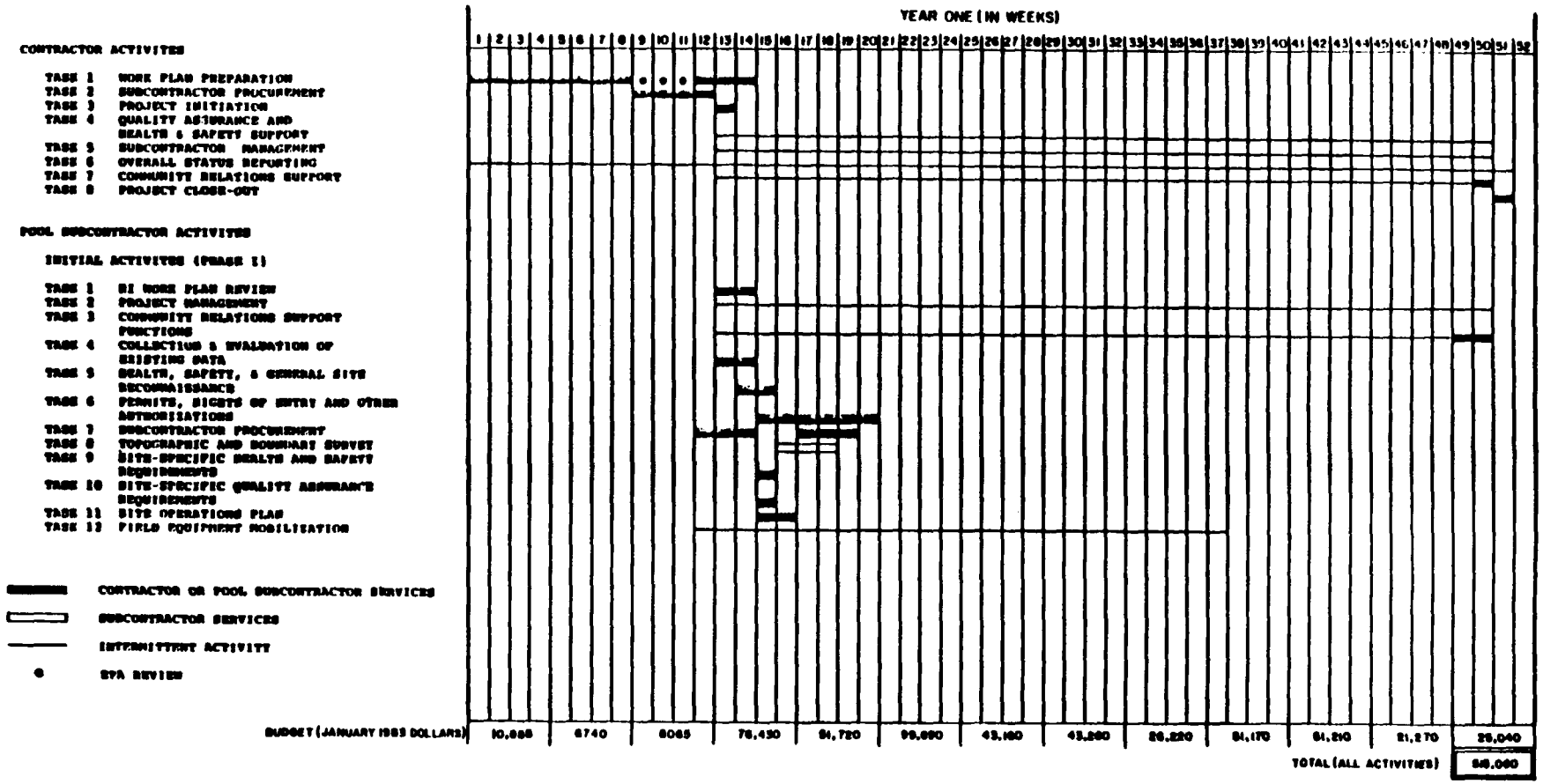
Four weeks each have been allotted for EPA review of deliverables produced in Tasks 20 and 25, and three weeks each have been allotted for agency review of Tasks 21, 24, and 26 deliverables.

A total of 6 meetings are anticipated in order to provide coordination with EPA at critical points within the RI/FS, and to review major task deliverables as shown in Figure 5-1. These meetings will be attended by both the Contractor and Pool Subcontractor. Additional coordination will be provided through frequent phone contact between the NUS Project Manager, Pool Subcontractor Project Manager, and the EPA Regional Site Project Officer.

The anticipated schedule is optimistic in making the following assumptions:

1. EPA and/or NJDEP will provide assistance and expedite necessary permit applications, rights of entry permission and other authorizations.

2. Contract Laboratory (CLP) analytical results will be received by NUS within two to four weeks. If more rapid turnaround is required and is unavailable from the CLP, alternate arrangements will be made. The schedule will not



(CONTINUED)

5-2

FIGURE 5-1

REMEDIAL ACTION SCHEDULE
ASBESTOS DUMP SITE MILLINGTON, NJ

NUS CORPORATION

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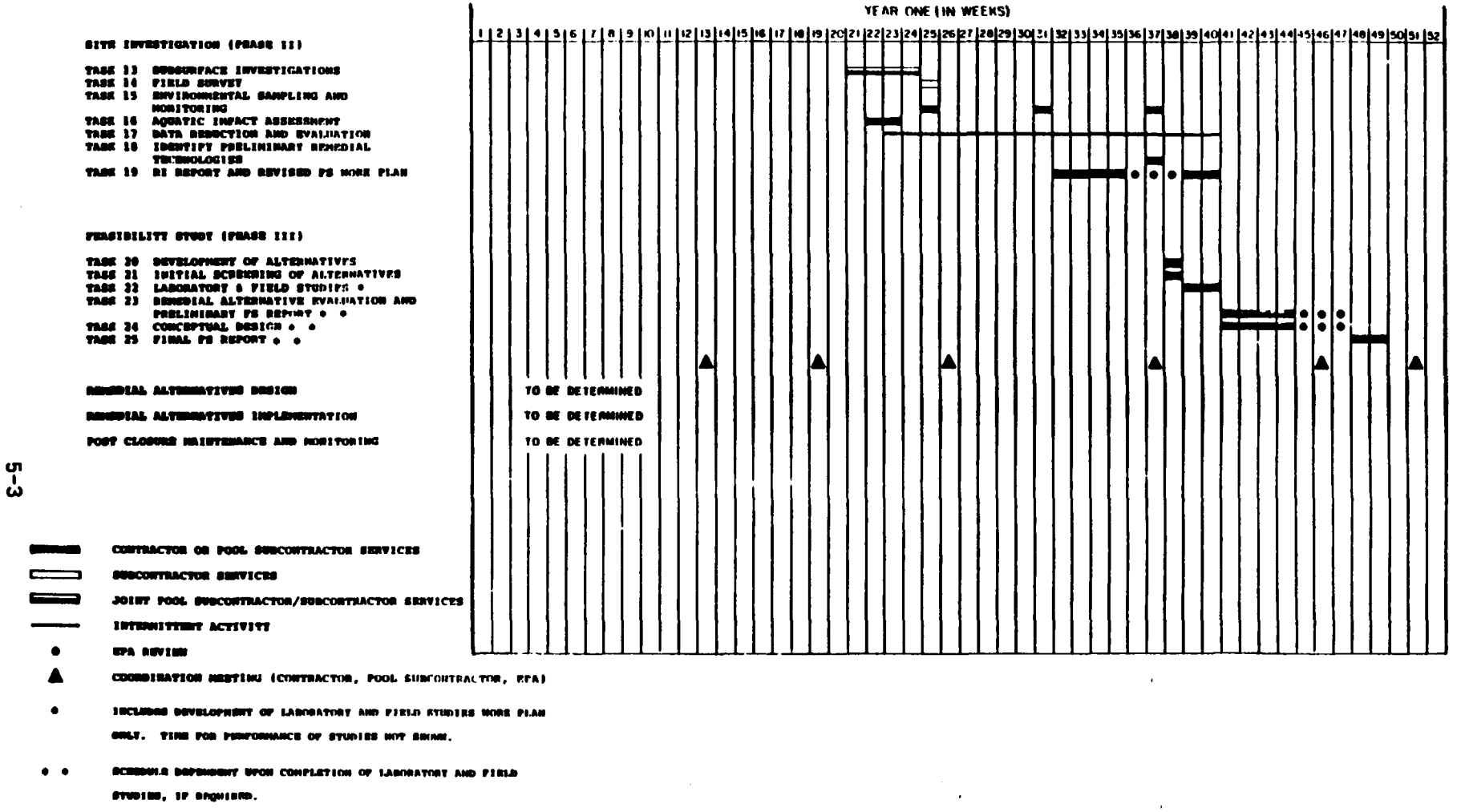

FIGURE 5-1 CON'T.

REMEDIAL ACTION SCHEDULE
ASBESTOS DUMP SITE, MILLINGTON, NJ

NUS CORPORATION

be adversely impacted as a result of data validation requirements imposed by EPA.

3. The schedule does not anticipate significant delays as a result of inclement weather.

5.2 Cost and Budget

Total project costs have been estimated at $515,060. Total manhours for NUS administration of the project have been estimated to be 1,932. Total Pool Subcontractor manhours for performance of the RI/FS Work Plan Scope of Work have been estimated to be 5,910. Total Pool Subcontractor costs have been estimated to be $385,824. It should be emphasized that Pool Subcontractor costs in this draft Work Plan have been estimated by NUS Corporation. Actual costs will be provided in the final Work Plan, which will be prepared following completion of the work assignment negotiations with the Pool Subcontractor. In addition, the level of effort (man-hours) and/or project costs may require revision in order to provide adequate support for EPA enforcement actions. Technical direction in this regard will be obtained from EPA enforcement personnel.

Table 5-1 provides a breakdown of projected labor hours for both NUS and the Pool Subcontractor to perform their respective scopes of work in conjunction with the Asbestos Dump Site RI/FS. Table 5-2 provides a summary of overall cost.

The use of the Contract Laboratory Program (CLP) is generally anticipated to fulfill analytical needs of the RI/FS. Total CLP analytical cost has been estimated to be $86,540 for the RI. This cost is not included in the above project cost. As a contingency, however, the above costs include approximately $16,500 for non-CLP analysis should the need arise. Table 5-3 provides an approximate breakdown of the CLP analytical cost.

In addition, laboratory and field studies required during the FS cannot be estimated at this time. These costs will be developed during the preparation of the

Laboratory and Field Studies Work Plan during Task 23. CLP analytical support is anticipated during these studies as well.

TABLE 5-1

PROJECT MANPOWER SUMMARY

CONTRACTOR WORK PLAN

TASK	DESCRIPTION	TASK MANHOURS
1	Work Plan Preparation	516
2	Subcontractor Procurement	64
3	Project Initiation	84
4	Quality Assurance Health & Safety Oversight	144
5	Subcontractor Project Management	780
6	Project Status Report	160
7	Community Relations Support Functions	80
8	Project Close-Out	104
	Total	1,932

SUBCONTRACTOR WORK PLAN

PHASE I

1	Work Plan Review	96
2	Project Management	720
3	Community Relations Support Functions	310
4	Collect and Evaluate Existing Data	52
5	Health, Safety and General Site Reconnaissance	178
6	Permits, Rights of Entry, and Other Authorizations	44
7	Subcontractor Procurement	184
8	Topographic and Boundary Survey	832
9	Site-Specific Health and Safety Requirements	44
10	Site-Specific Quality Assurance Requirements	68
11	Site Operations Plan	140
12	Field Equipment Mobilization	52
	Subtotals	**2,784**

TABLE 5-1
PROJECT MANPOWER SUMMARY
PAGE TWO

TASK	DESCRIPTION	TASK MANHOURS
PHASE II		
13	Subsurface Investigations	322
14	Field Survey	136
15	Environmental Sampling and Monitoring	550
16	Aquatic Impact Assessment	216
17	Data Reduction and Evaluation	204
18	Identification of Remedial Technologies	70
19	RI Report and Revised FS Work Plan	300
	Subtotals	1,798
PHASE III		
20	Development of Alternatives	60
21	Initial Screening of Alternatives	68
22	Laboratory and Field Studies	120
23	Evaluation Preliminary FS Report	360
24	Conceptual Design	480
25	Final Report	240
	Subtotals	1,328
	TOTAL	5,910

TABLE 5-2

ASBESTOS DUMP
MILLINGTON, NEW JERSEY

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
STUDY COST SUMMARY
(JANUARY 1983 DOLLARS)

Direct Labor	27,885
Travel and Living	6,815
Other Direct Costs	4,400
Special Equipment	0
Pool Subcontractor	385,824
Indirect Costs and Fee	90,136
Total (excluding CLP)	515,060
CLP Lab Analysis	86,540

Note: Costs associated with laboratory and field studies during the FS will be developed during the preparation of a Laboratory and Field Studies Work Plan (Task 22).

TABLE 5-3

CLP LABORATORY ANALYSIS COST ESTIMATE

Sample Collection Task	Sample Type	No. of Samples	Analytical Parameter(s)	Unit Cost	Extension
Task No. 5	Ambient Air	34	AFC	30.00	1,020.00
		6	SEM/TEM	500.00	3,000.00
Task No. 5	Surface Water	18	HSL	800.00	14,400.00
		18	AFC	30.00	540.00
Task No. 5	Sediment	9	HSL	1,100.00	9,900.00
		9	MC	60.00	540.00
Task No. 5	Asbestos Shingle	7	MC	60.0	420.00
Task No. 13	Subsurface Soil/Waste	4	MC	60.00	240.00
		16	HSL	1,100.00	17,600.00
	Ambient Air	16	AFC	30.00	480.00
Task No. 13	Groundwater (Monitoring Wells)	26	HSL	800.00	20,800.00
Task No. 15	Groundwater	52	IND	200.00	10,400.00
Task No. 15	Surface Water	36	IND	200.00	7,200.00
TOTALS		243			86,540.00

AFC = Asbestos Fiber Count by Polarized Light Microscope
SEM/TEM = Asbestos Fiber Count and Identification by Scanning or Transmission Electron Microscopy
HSL = Hazardous Substances Organics and Inorganics
MC = Mineralogical Composition
IND = Indicator Parameters based upon HSL scans

REFERENCES

Tucker, D., June 25, 1971. Application for Department of the Army, Corps of Engineers permit to discharge to Passaic River. National Gypsum Company, Buffalo, New York.

Gelberman, J., March 16, 1972. Correspondence re: COE discharge permit; identification of additional data requirements. Chief, Operations Division, COE.

Tucker, D., July 31, 1972. Correspondence re: Revised application submittal. President, National Gypsum Company, Buffalo, New York.

Jurewicz, E., July 31, 1972. Correspondence re: Resubmittal of permit application noting reduction in flow volume as result of recent conservation measures. Chief Engineer - Fluids Control, National Gypsum Company, Buffalo, New York.

Ferrazzuolo, R., October 24, 1972. Correspondence re: Comments on permit application. Enforcement Division, USEPA, New York, New York.

Bennett, G., January 15, 1973. Correspondence re: Forwarding of proposed abatement conditions to be placed upon permit application for review by NJDEP. Director, Enforcement Division, USEPA, New York, New York.

Schmidt, W., July 19, 1973. Correspondence re: Note that polyurethane foam block production discontinued: estimate that flow rate has been reduced by 10,000 GPD as result of recently constructed conservation measures. Chief Engineer - Environmental, National Gypsum Company, Buffalo, New York.

Bennett, G., June 26, 1973. Correspondence re: Discharge Permit Application 2SD OXW 2 00570; initiation of review. Director, Enforcement Division, USEPA, New York, New York.

Regna, E., July 31, 1973. Correspondence re: Note that pending Refuse Act permit application will be treated as NPDES application by EPA; no need to reapply. Acting Chief, Industrial Water Facilities Branch, USEPA, New York, New York.

Unknown. December 12, 1973. Permit Summary Table (NPDES). Source Unknown.

Rooney, J., February 6, 1974. Memo re: NPDES Permit No. NJ002429; recommendation that permit be issued. Acting Chief, Technical Evaluation Section, USEPA, New York, New York.

USEPA. Undated, circa March 1974. Draft NPDES Permit No. NJ002429. USEPA, New York, New York.

USEPA. March 8, 1974. Public Notice of receipt of complete application No. NJ002429. USEPA, New York, New York.

Willinger, R., April 17, 1974. Evaluation of draft NPDES permit for National Gypsum Site by New Jersey Public Interest Research Group (NJPIRG). Director, NJPIRG, Trenton, New Jersey.

USEPA. April 26, 1974. Issuance of final NPDES permit. USEPA, New York, New York.

Beggs, W., R. Pyarilal., January 7, 1975. Memo re: Visit to Asbestos Dump Site; evaluation of National Gypsum proposal for total recycle in asbestos manufacture. Water Pollution Control, NJDEP, Trenton, New Jersey.

Schmidt, W., Undated, circa January 1975. Summary of current situation. Chief Engineer - Environmental, National Gypsum Company, Buffalo, New York.

Lynch, Peter, January 20, 1975. Correspondence re: Failure of National Gypsum to comply with construction schedule for additional treatment facilities noted in

NPDES application. Chief, Water Enforcement Branch, NJDEP, Trenton, New Jersey.

Beggs, W., March 11, 1975. Correspondence re: Verbal approval of design of total recycle system, noting exceptions. Principal Environmental Engineer, Water Pollution Control, NJDEP, Trenton, New Jersey.

Schmidt, W., May 21, 1975. Correspondence re: Notification to EPA that National Gypsum was permanently closing Millington Plant. Chief Engineer -Environmental, National Gypsum Company, Buffalo, New York.

Schmidt, W., September 22, 1975. Correspondence re: Submittal to EPA of Affidavit for Exemption due to plant closure. Chief Engineer - Environmental, National Gypsum Company, Buffalo, New York.

Reilly, G., September 27, 1977. Deposition noting that National Gypsum discontinued practice of dumping waste material behind plant when they took over operations from Smith Company in 1953. Former Plant Manager, National Gypsum Company, Millington Plant, Millington, New Jersey.

Indelicato, E., December 19, 1977. Correspondence re: No need for stream encroachment permit for removal of unauthorized landfill at Millington Plant due to plant closure. Violation Coordinator, Bureau of Flood Plain Management, NJDEP, Trenton, New Jersey.

Tylutki, B., February 16, 1978. Correspondence re: Notification to National Gypsum that Millington Site poses potential contamination problem; issuance of Administratie Order requiring corrective action. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Unknown. April 1978. Engineering Report 78M-1, Millington, New Jersey. National Gypsum Company, Buffalo, New York.

Bishop, G., April 3, 1978. "DEP Ignores Its Own Deadline to Curb Passaic River Polluter" Newark Star Ledger, Newark, New Jersey.

Tylutki, B., April 20, 1978. Memo re: Notification to Bureau of Flood Plain Management that expedited review of need for National Gypsum stream encroachment permit. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Tylutki, B., April 27, 1978. Correspondence re: Notification to National Gypsum Company that Engineering Report 78M-1 is deficient; suggesting joint meeting at site to resolve questions. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Chheda, P., June 9, 1978. Correspondence re: Submission to NJDEP of final engineering plan as result of onsite discussions. National Gypsum Company, Buffalo, New York.

Tylutki, B., June 27, 1978. Correspondence re: Notification of US Fish & Wildlife Service that asbestos deposits are located on the Dietzman Tract within the Great Swamp National Wildlife Refuge; requesting action. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Tylutki, B., July 3, 1978. Correspondence re: Notification of National Gypsum Company that a stream encroachment permit is required for corrective action at Millington Plant. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Chheda, P., August 8, 1978. Engineering Drawing re: Minor repair along Passaic River bank. National Gypsum Company, Buffalo, New York.

O'Dowd, J., September 29, 1978. Memo re: Receipt and approval of stream encroachment permit. Acting Bureau Chief, Bureau of Flood Plain Management, NJDEP, Trenton, New Jersey.

Unknown. Undated, circa October 1978. Excerpt from unknown report summarizing action of Passaic River Coalition in regard to Asbestos Dump Site. Source Unknown.

O'Dowd, J., October 2, 1978. Stream Encroachment Permit No. 8419. Acting Chief, Bureau of Flood Plain Management, NJDEP, Trenton, New Jersey.

Tylutki, B., October 10, 1978. Correspondence re: Approval of National Gypsum Company plans for remedial action at Millington Plant. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Tylutki, B., November 14, 1978. Correspondence re: Indication to Michael Barta that periodic site inspections will be made to oversee remedial action at Millington Site; note that USEPA testing has detected no asbestos fibers in water from Passaic Valley Water Authority. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Chheda, P., December 8, 1978. Correspondence re: Notification to SWA that remedial work at Millington Plant is underway, but requesting extension of December 31 deadline. Structural Engineer, National Gypsum Company, Buffalo, New York.

Barta, M., January 2, 1979. Correspondence re: Complaints regarding delays in resolving problem at Millington Site; offers additional insight to problem as a result of his former employment with National Gypsum. Citizen, Basking Ridge, New Jersey.

Irenas, J., January 10, 1979. Correspondence re: Note that National Gypsum Company was proceeding with site work, but was ordered off of the property by TIFA, Ltd. on December 11, 1978. McCarter & English, Newark, New Jersey.

Seidel, J., January 12, 1979. Correspondence re: Rebuttal of Irenas (January 10, 1979) on behalf of TIFA, Ltd. Seidel, Stauber, & Wong, Morristown, New Jersey.

Schaan, F., March 9, 1979. Bid for construction of reinforced concrete pipe to carry stormwater runoff around asbestos pile. Fred J. Schaan & Son, Stirling, New Jersey.

Tylutki, B., June 25, 1979. Memo re: Note that remedial work at Millington Plant is nearing completion following long delay resulting from litigation and permit requirements. Director, Solid Waste Administration, NJDEP, Trenton, New Jersey.

Witte, G. June 26, 1979. Correspondence re: Settlement Agreement between TIFA, Ltd., and National Gypsum Company. McCarter & English, Newark, New Jersey.

Edwards, J., June 27, 1979. Investigative Report; noting meeting with Herb May (site contractor) and William Bryant (site engineer); discussion of proposed work. NJDEP, Trenton, New Jersey.

TIFA, Ltd., Undated, circa June 1978. Release agreement. TIFA, Ltd., Millington, New Jersey.

National Gypsum Company. Undated, circa June 1978. Release agreement. National Gypsum Company, Buffalo, New York.

Chheda, P., July 3, 1979. Correspondence re: Notification that National Gypsum has authorized field engineer (William Bryant) onsite and is proceeding with remedial action. Structural Engineer, National Gypsum Company, Buffalo, New York.

Edwards, J., July 6, 1979. Investigative Report; noting about 6 inches of riprap in stream and along bank, sketch attached. NJDEP, Trenton, New Jersey.

Edwards, J., July 10, 1979. Investigative Report; noting construction of interim roadway across asbestos dump, estimating one week required for completion of work. NJDEP, Trenton, New Jersey.

Chheda, P., July 27, 1979. Correspondence re: Submission of Completion Report for remedial activity. Structural Engineer, National Gypsum Company, Buffalo, New York.

Edwards, J., August 15, 1979. Investigative Report; noting that project is completed, no erosion, good vegetative cover. NJDEP, Trenton, New Jersey.

Lynch, P., August 21, 1979. Memo re: Summary of site history and regulatory activities (brief). NJDEP, Trenton, New Jersey.

Berry, T., Undated, circa December 1980. Correspondence re: Notification to NJDEP Division of Hazards Management that four asbestos dumps are located in Millington area; includes maps showing locations. Director, Essex County Toxics and Pollutants Project, West Orange, New Jersey.

Faherty, D., December 16, 1980. Memo re: Inspections of areas noted by Berry (undated, circa December 1980). NJDEP, Trenton, New Jersey.

Muzyka, L., May 4, 1981. Memo re: Inspection of TIFA, Ltd., facility at Millington; primary purpose to determine whether pesticides were manufactured or used at plant. NJDEP, Trenton, New Jersey.

Schwartz, B., May 22, 1981. Memo re: Detailed summary of site history and regulatory action at Millington Site; suggestions for further action. Deputy Chief, Office of Enforcement, NJDEP, Trenton, New Jersey.

Schwartz, B., May 26, 1981. Memo re: March 26 visit to TIFA, Ltd., site inspection. Deputy Chief, Office of Enforcement, NJDEP, Trenton, New Jersey.

Mikulka, J., June 2, 1981. Memo re: Results of file review in regard to Millington Site. NJDEP, Office of Enforcement, Trenton, New Jersey.

Faherty, D., July 22, 1981. Memo re: Discussion of health problem presented by asbestos in Millington with Peter Hauge (NJDEP). NJDEP, Trenton, New Jersey..

Faherty, D., August 26, 1981. Memo re: Note that EPA is satisfied that filters at downstream potable water intakes prevent harmful amounts of asbestos from entering water supply of Commonwealth Water Company. NJDEP, Trenton, New Jersey.

Cunningham, G., September 17, 1981. Memo re: Site inspection. NJDEP, Trenton, New Jersey.

Bobal, R., August 6, 1982. Mitre Model scoring of Asbestos Dump Site (Millington Site). USEPA, New York, New York.

Bobal, R., August 11, 1982. USEPA Potential Hazardous Waste Site, Site Inspection Report. USEPA, New York, New York.

Unknown. Undated, circa August 1982. Bibliography of Information Sources Used to Apply the Hazard Ranking System. Source Unknown.

Unknown. Undated, circa August 1982. Documentation Records for Hazard Ranking System. Source Unknown.

Faherty, D., February 24, 1983. Memo re: Note that NJDEP had been contacted by TIFA, Ltd., offering to do additional stabilization work, but noting that National Gypsum Company does not want work done. Site Manager, Bureau of Solid Waste Management, NJDEP, Trenton, New Jersey.

Klein, G., July 27, 1983a. Memo re: Inspection of Millington Asbestos Dump (Millington Plant), July 8, 1983. Site Manager, Bureau of Solid Waste Management, NJDEP, Trenton, New Jersey.

Klein, G., July 27, 1983b. Memo re: Inspection of Millington Asbestos Dump #1. Site Manager, Bureau of Solid Waste Management, NJDEP, Trenton, New Jersey..

Klein, G., July 27, 1983c. Memo re: Inspection of Millington Asbestos Dump #2. Site Manager, Bureau of Solid Waste Management, NJDEP, Trenton, New Jersey.

Klein, G., July 27, 1983d. Memo re: Inspection of Millington Asbestos Dump #3. Site Manager, Bureau of Solid Waste Management, NJDEP, Trenton, New Jersey.

Klein, G., July 27, 1983e. Memo re: Inspection of Millington Asbestos Dump #4. Site Manager, Bureau of Solid Waste Management, NJDEP, Trenton, New Jersey.

APPENDIX A

ASBESTOS DUMP SITE
SITE CHRONOLOGY

1927	Asbestos Ltd. begins operations at the Millington Site; waste was disposed of in onsite settling pits. Waste process water ran to the river, overtopping dams built to provide settling of solids.
1948	Asbestos Ltd. sells the Millington site to Smith Asbestos, who continues previous waste disposal practices.
1952-1953	Smith Asbestos sells the Millington site to NGC. NGC may or may not have continued dumping asbestos waste on the pile after their acquisition of the property.
1962	A report notes that solids were trucked away from the Millington site to an undisclosed landfill.
June 25, 1971	NGC makes application to the Corps of Engineers for a permit to discharge process wastewater to the Passaic River.
July 19, 1973	NGC indicates that manufacture of rigid polyurethane foam block had been discontinued. Installation of water conservation and pollution control equipment (mixing equipment with a coagulant; close-looping the condensate system; and a valve to prevent stream overflow from the process cones) had reduced discharge on the average by about 10,000 gpd (from 70,000 gpd).

July 31, 1973	NGC is notified by the EPA that the pending Refuse Act discharge permit application will be considered NPDES permit application No. NJ002429 under the 1972 Federal Water Pollution Control Act amendments.
March 8, 1974	EPA initiates public notice of the draft NPDES permit.
April 17, 1974	The final NPDES permit is issued with an expiration date of April 30, 1979. The permit requires construction of additional treatment facilities, and reduction of the discharge pH to 6-9 within 12 months.
January 7, 1975	Inspection of the Millington site by NJDEP reveals two process water discharges, one from the asbestos process and the second from a paint wash line into an unlined lagoon.
January 1975	NGC notes that approximately 50% of the plant production capacity is not in use; average discharge is 55,000 gpd. NGC is attempting to go to total recycle with the asbestos process water, but may be limited by economics.
April 26, 1975	The wet end of the asbestos shingle manufacturing process is shut down.
May 16, 1975	The Millington plant is closed due to economics and environmental constraints.
1976	TIFA, Ltd. purchases the Millington Plant from NGC.
January 25,1977	NJDEP, Bureau of Flood Plain Management cites NGC for an unauthorized fill along the Passaic River; requests either removal of the fill or submission of necessary stream encroachment permit appications.

September 27,1977	George Reilly states that during his tenure as former plant manager of the Millington Plant from 1950-1975, waste disposal on the pile was only by Smith Asbestos, and that NGC discontinued this practice shortly after purchasing the site.
October 11, 1977	The Millington Planning Board approves TIFA Ltd.'s occupancy of the Millington site.
November 22, 1977	NGC is notified by the BFPM that a stream encroachment permit is not required as a result of George Reilly's deposition.
December 1977	Local citizens complain of exposed asbestos waste at the Millington site as a result of erosion.
1977-1979	The Passaic River Coalition raises the question of pollution of the Passaic River with asbestos waste.
February 16, 1978	NJDEP, SWA issues an Administrative Order to NGC requiring corrective action to abate potential pollution problems at the Milligton site. All exposed material was to have been covered and a long-term plan submitted for remediation of the site within 30 days.
March 1978	NJDEP, DWR samples the Passaic River above and below the Millington site.
April 1978	NGC submits "Engineering Report 78M-1" as a plan for long-term stabilization of the asbestos pile.
April 27, 1978	NJDEP, SWA indicates deficiencies in the plan, and requests resubmittal following onsite discussions.

June 9, 1978	Final engineering plans are submitted.
June 27, 1978	NJDEP, SWA notifies the US Fish and Wildlife Service of asbestos dumps in the Great Swamp area and requests action.
September 29, 1978	NJDEP, BFPM issues a stream encroachment permit to NGC for remedial action in accord with the engineering plan.
October 10, 1978	NJDEP, SWA approves amended plans for stabilization of the Millington site.
December 8, 1978	NGC notifies the SWA that a contractor is onsite and work is scheduled to begin.
December 11, 1978	NGC is denied access to the Millington site for corrective work by TIFA, Ltd.
January 2, 1979	Michael Barta, former NGC employee, registers complaints with the SWA regarding delays in remedial action at the Millington site. He further notes that phenyl mercuric acetate (PMA) was dumped directly into the Passaic River during active plant operations.
March 9, 1979	TIFA, Ltd. notes that they had barred NGC from the site because the erosion control proposed by NGC would have resulted in asbestos fibers being eroded from the pile into the river. They suggested a reinforced concrete pipe (RCP) storm drain.
June 26, 1979	NGC and TIFA, Ltd. execute a settlement agreement: NGC will remove sediment from the river and install riprap at the toe of the pile; TIFA Ltd. will install a 48" RCP storm drain.

July 3, 1979	NGC initiates site work.
August 15, 1979	NJDEP site inspections note that the project is completed and that a good vegetative cover has been established.
1980	TIFA, Ltd. began regrading a portion of the surface of the pile for additional buildings and parking.
December 1980	The New Jersey Public Interest Research Group notifies the NJDEP Division of Hazards Management of the four asbestos dumps in the Millington area, expressing concern over erosion at the Millington site, and public exposure at the remaining sites.
December 16, 1980	Inspections of the Millington site by the NJDEP, Bureau of Site Management indicate "large" areas of exposed asbestos due to erosion of soil cover.
March 26, 1981	NJDEP inspects the TIFA facility and the asbestos dump site. At this point TIFA, Ltd. refuses to accept any responsibility for the dump.
May 11, 1981	NJDEP samples stormwater from the culvert at the Millington site, and the Passaic River both up and downstream of the site.
August 6, 1982	Mitre model ranking of the Millington Site is completed by USEPA, Region II.
August 11, 1982	USEPA prepares Potential Hazardous Waste Site, Site Inspection Report.

July 27, 1983	NJDEP, Bureau of Site Management inspects the Millington site and notes areas of exposed asbestos waste. NGC is requested to undertake additional corrective action. The remaining dump sites are also inspected and recommendations are made for environmental sampling.
July 1983	NGC undertakes the remedial action.
November 2, 1983	NUS Corporation conducts a site investigation of the four dump sites in the Millington area.